Service Manual

FILE No: HMRSM-001-01

Ultra-low Temperature Refrigerator

DW-86L288•DW-86L338•DW-86L388•DW-86L388A

DW-86L486•DW-86L628•DW-86L728•DW-86L828

DW-86W100 •DW-86W420

Haier Medical & Laboratory Products Co., Ltd.

Effective models

This service manual is effective for following models

Model name	Product code	Voltage(V)	Frequency(Hz)	Plug-type
DW-86L288	BE06S8E1T	220	50	All
DW-86L338	BE0FU3E1T	220	50	All
DW-86L388	BE06RCE1T	220	50	All
DW-86L388A	BE0FV3E1T	220	50	All
DW-86L486	BE06RJE1T	220	50	All
DW-86L490	BE06QGE1T	220	50	All
DW-86L626	BE03D2E1T	220	50	All
DW-86L628	BE06QLE1T	220	50	All
DW-86L728	BE0EZLE1T	220	50	All
DW-86L828	BE0F09E1T	220	50	All
DW-86W100	BE0385E1T	220	50	All
DW-86W420	BE0381E1T	220	50	All

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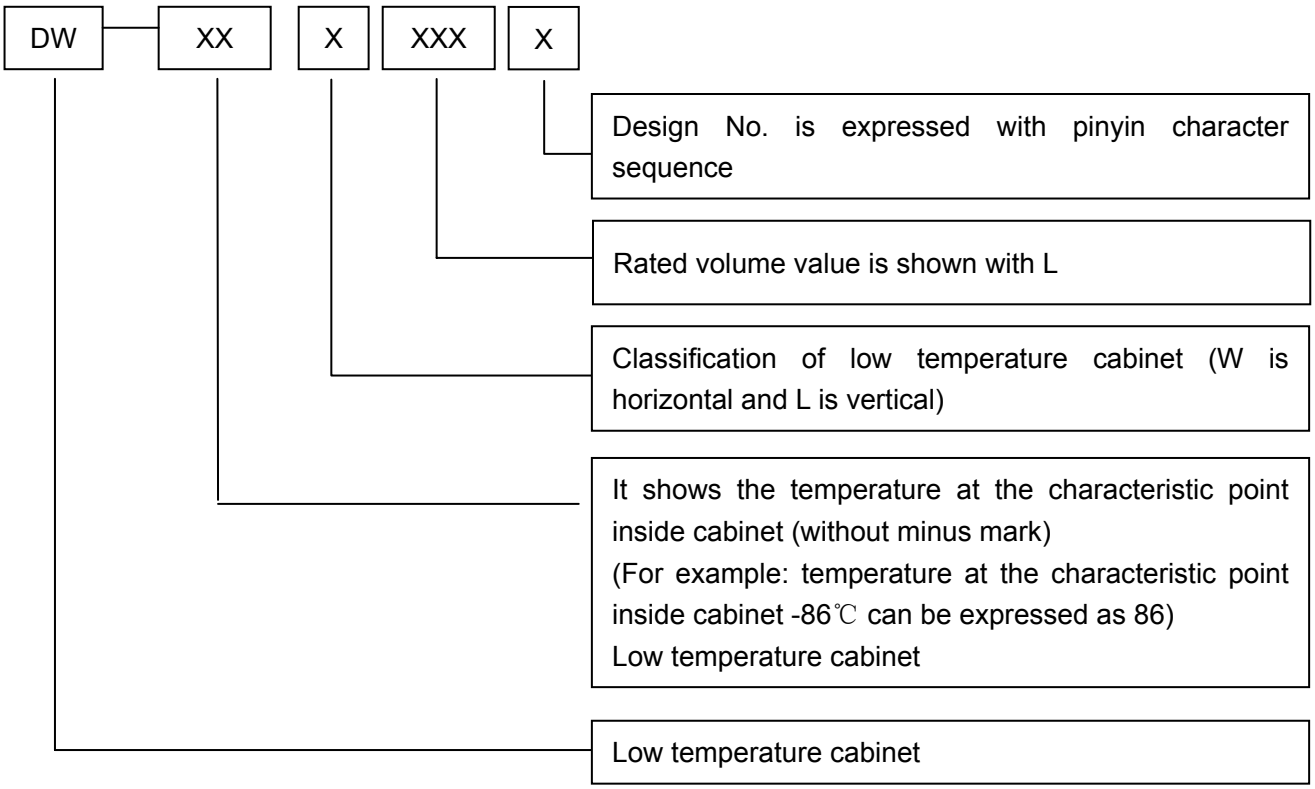
【Designation】

Regulations for type naming:


DW
XX
X
XXX
X
Design No. is expressed with pinyin character sequence
Rated volume value is shown with L
Classification of low temperature cabinet (W is horizontal and L is vertical)
It shows the temperature at the characteristic point inside cabinet (without minus mark)
(For example: temperature at the characteristic point inside cabinet -86℃ can be expressed as 86)
Low temperature cabinet
Low temperature cabinet

Note: rated volume can be the gross volume or effective volume; the manufacturer can decide it by him according to the actual situation. The effective volume value must be marked on the nameplate whether effective volume or gross volume is marked in the product name.

Examples:

DW-86L628 means that the Ultra-low temperature storage refrigerator with the temperature at characteristic temperature -86℃, horizontal and rated effective volume 628L.

【Introduction to product features】

1.1 Temperature inside the ultralow temperature cabinet: -10~-86℃, adjustable，temperature set arrange -40～-86℃；

1.2 Balanced pressure design inside and outside the cabinet, the door is easily opened and closed；

1.3 Temperature inside the cabinet, high and low temperature setting, ambient temperature and input voltage can be displayed on the display screen，High and low temperature alarm and temperature inside the cabinet can be set.；

1.4 Temperature inside the cabinet, high and low temperature setting, ambient temperature and input voltage can be displayed on the display screen；

1.5 Various fault alarms (high and low temperature alarm, sensor alarm, high and low voltage alarm, alarm of bad radiating of the condenser, alarm of ambient temperature exceeding standard, LV alarm and power failure alarm)；

1.6 Two alarm modes (voice buzz alarm and light flashing alarm)., Multiple protective functions (startup delay protection, LV compensation protection and HV compensation protection)；

1.7 It has network functions, provided with RS-232 data interface, to connect the computer, then the temperature inside cabinet can be displaced via computer, to display the alarm information. The temperature can be controlled by computer and whether the monitoring equipment is normal；

1.8 It has the remote alarm function, to connect the alarm equipment to realize alarm funciton of other rooms；

1.9 HV and LV automatic compensation function.；

1.10 Caster wheels are provided, which are flexible, movable and locked；

1.11 Recorder, network monitoring system, short message software, freezing rack and freezing box can be provided；

1.12 It has the function of short message alarm control, 1) automatically send the alarm measage to 2 users at the same time, 2) the user can send the short meassage to machine to inquire temperature and alarm, 3) the user can send the short message to machine via mobile, to set the temperature inside cabinet, high and low temperature alarm value, etc.

【Product appearance】

DW-86L388/486/628/728/828

DW-86L288

DW-86L338/388A

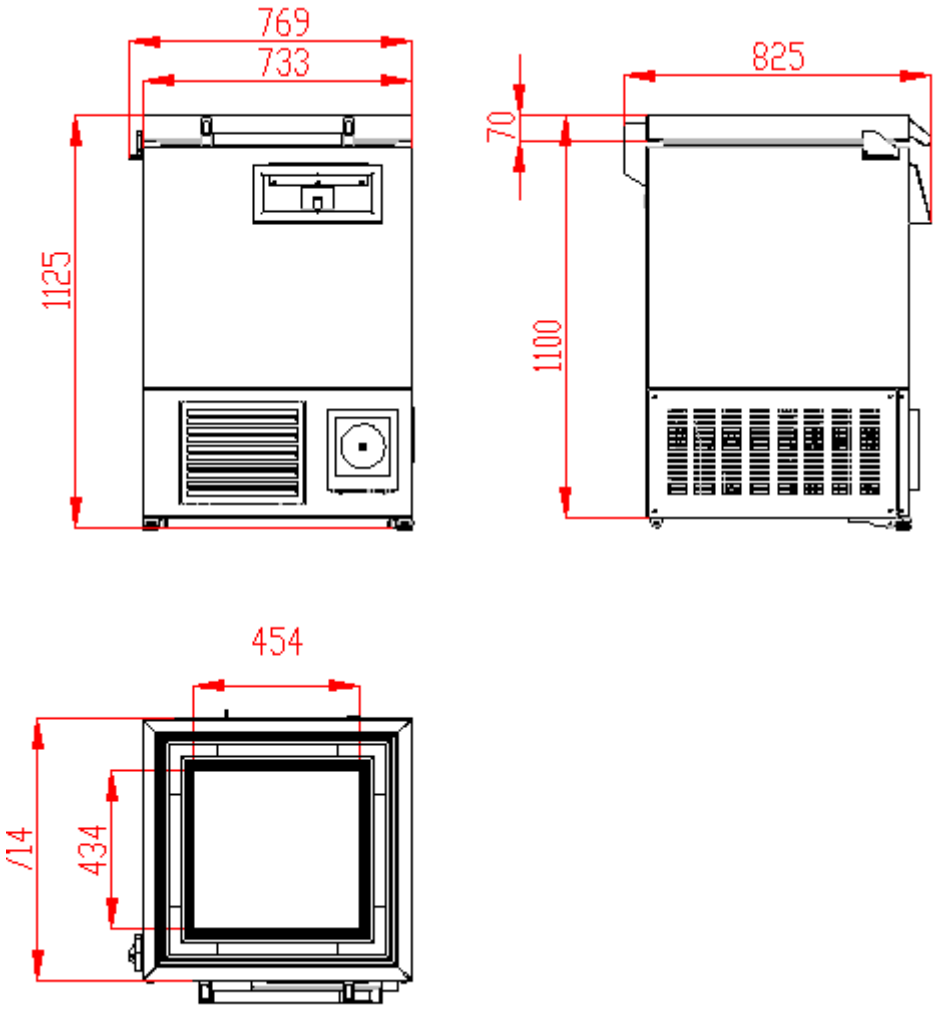
DW-86L490

DW-86W100

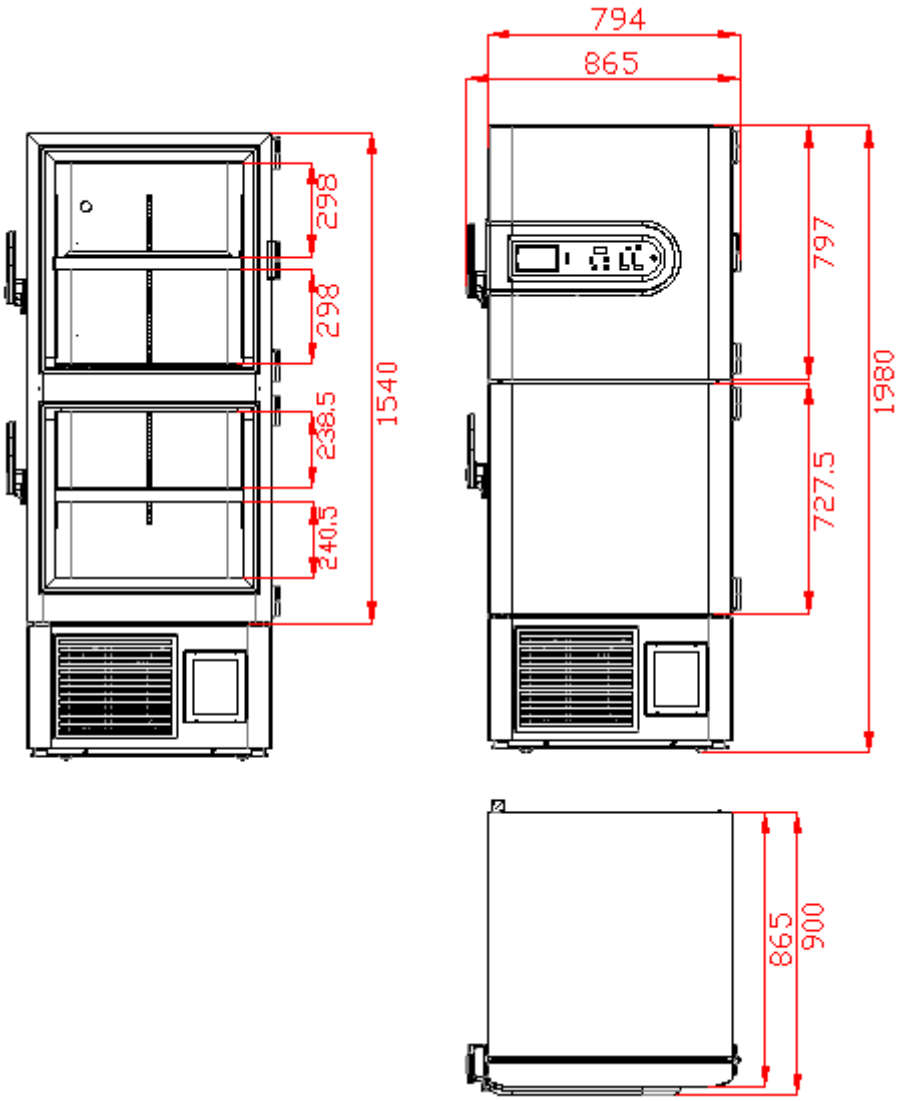
DW-86W420

【Dimensions】

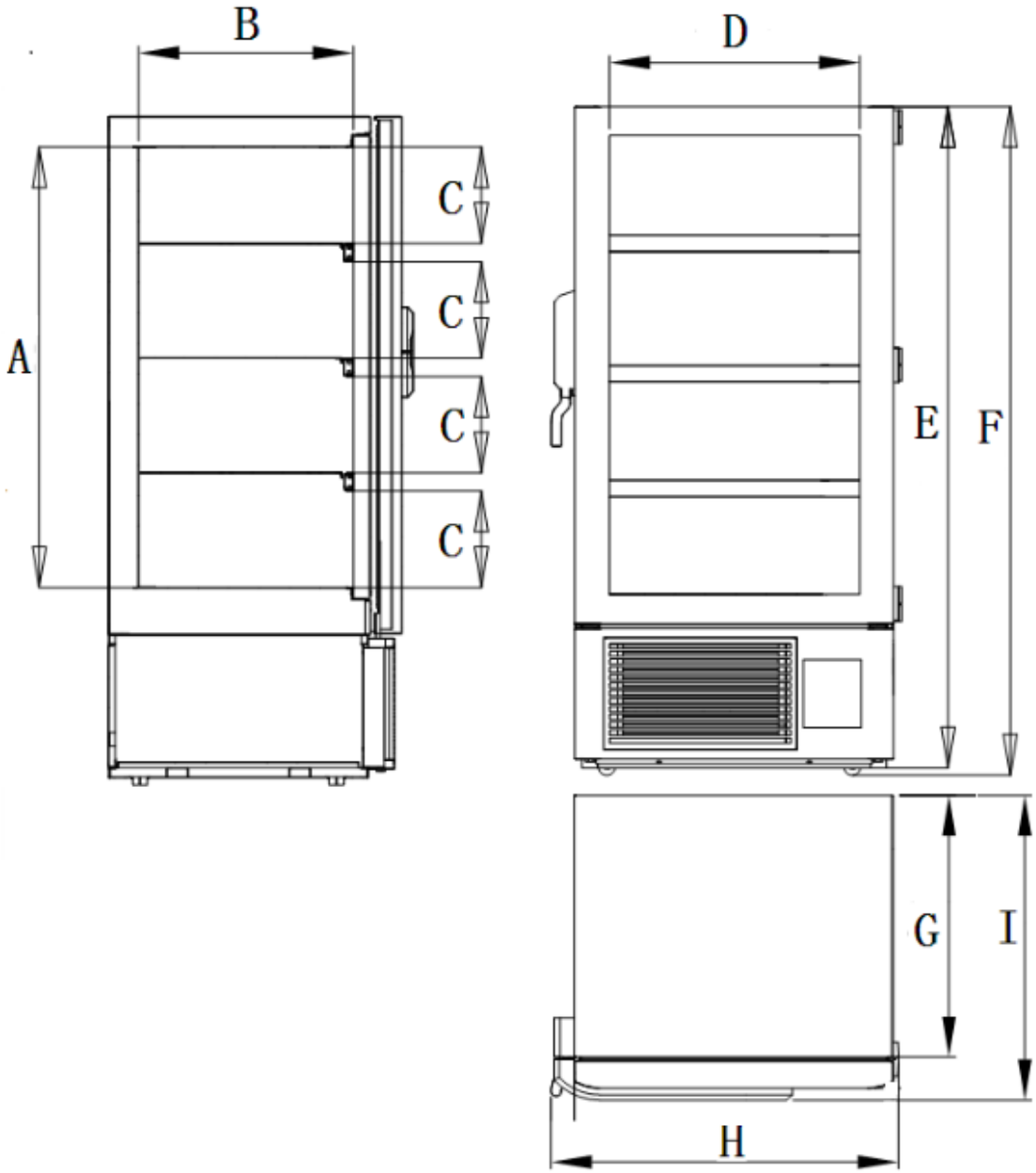
DW-86W100



DW-86L490



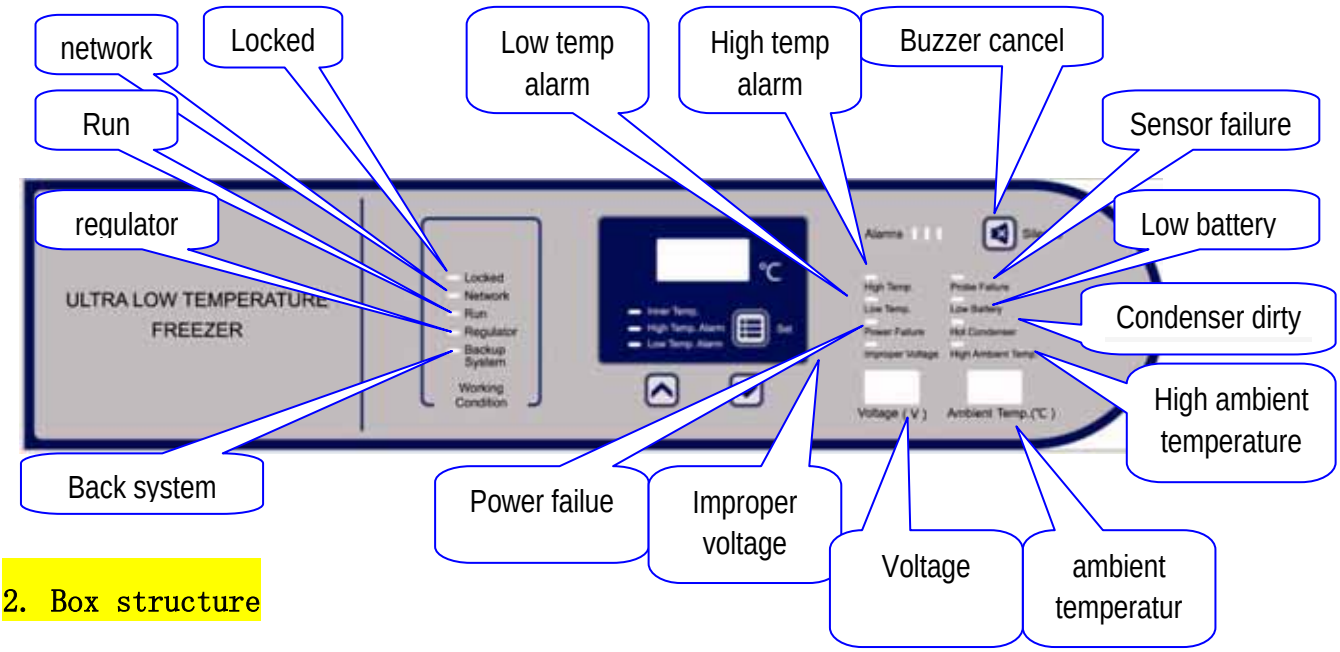
Other Modles



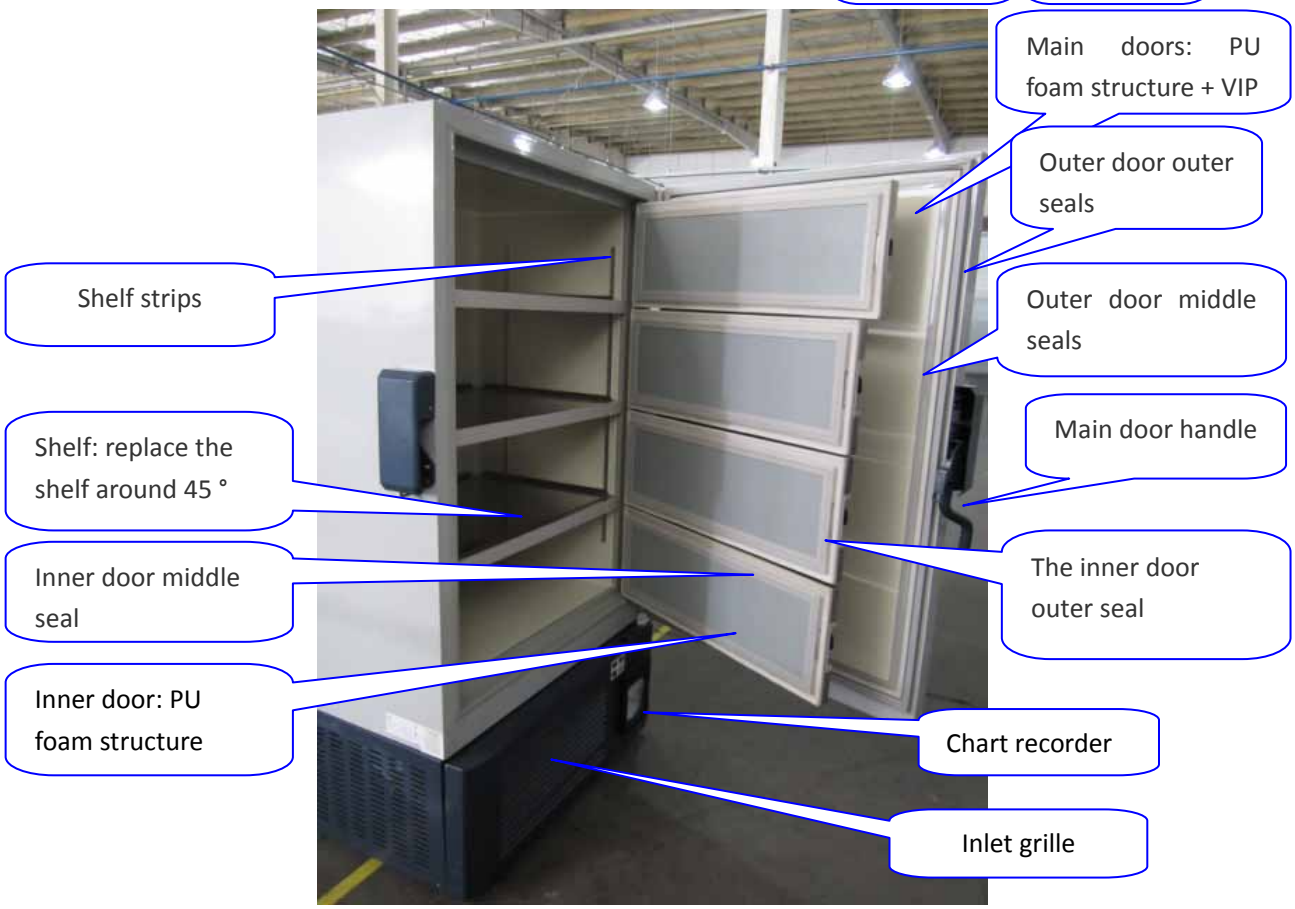
SN	Model	A	B	C	D	E	F	G	H	I
1	DW-86L388	1310	550	296	620	1960	1980	620	915	870
2	DW-86L486	1310	630	296	590	1960	1980	590	945	900
3	DW-86L628	1310	630	296	760	1960	1980	760	1035	900
4	DW-86L728	1310	630	296	870	1960	1980	870	1145	900
5	DW-86L828	1310	710	296	870	1960	1980	870	1145	980

【Parts layout】

1. Display structure

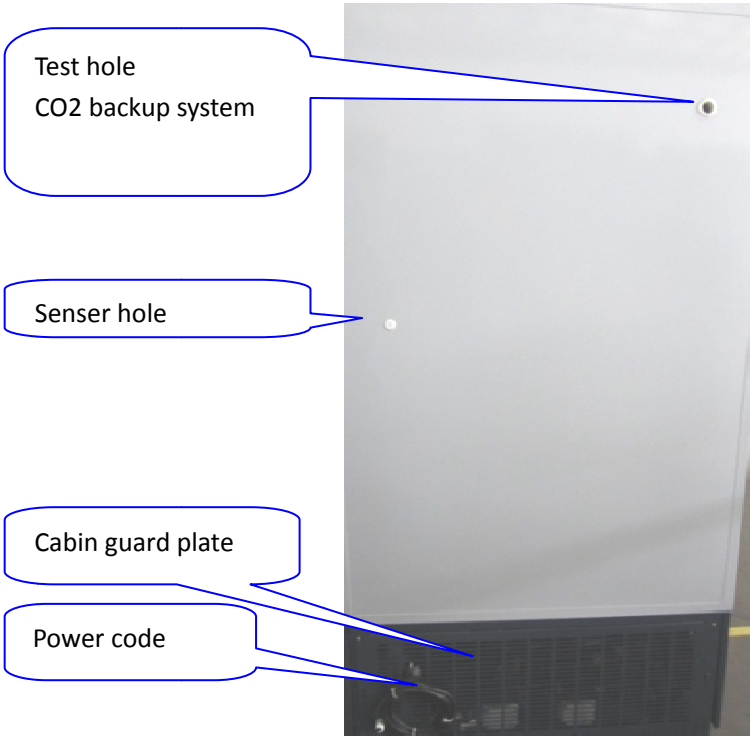


2. Box structure

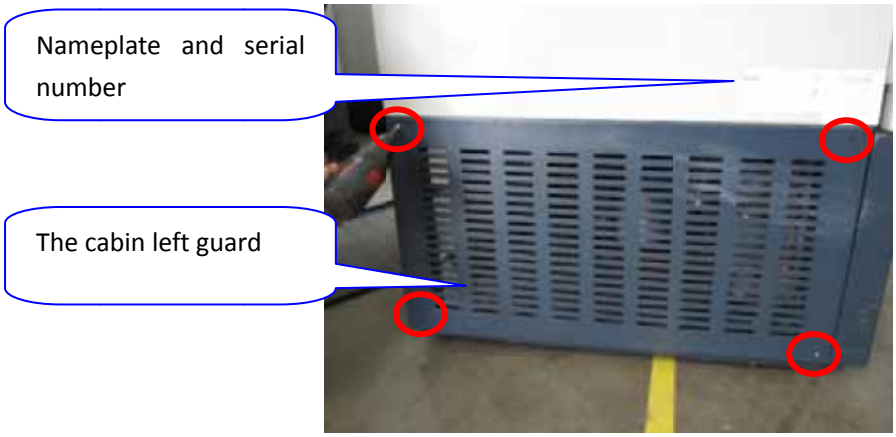

Main doors: PU foam structure + VIP
Outer door outer seals
Shelf strips
Outer door middle seals
Main door handle
Shelf: replace the shelf around 45 °
Inner door middle seal
The inner door outer seal
Inner door: PU foam structure
Chart recorder
Inlet grille

Main senser: The fixed cover of the main sensor in the box
Stainless steel shelving fixed clamp
Inner color: Cream yellow
Material: electro-galvanized steel sheet
Box beams decorated bar

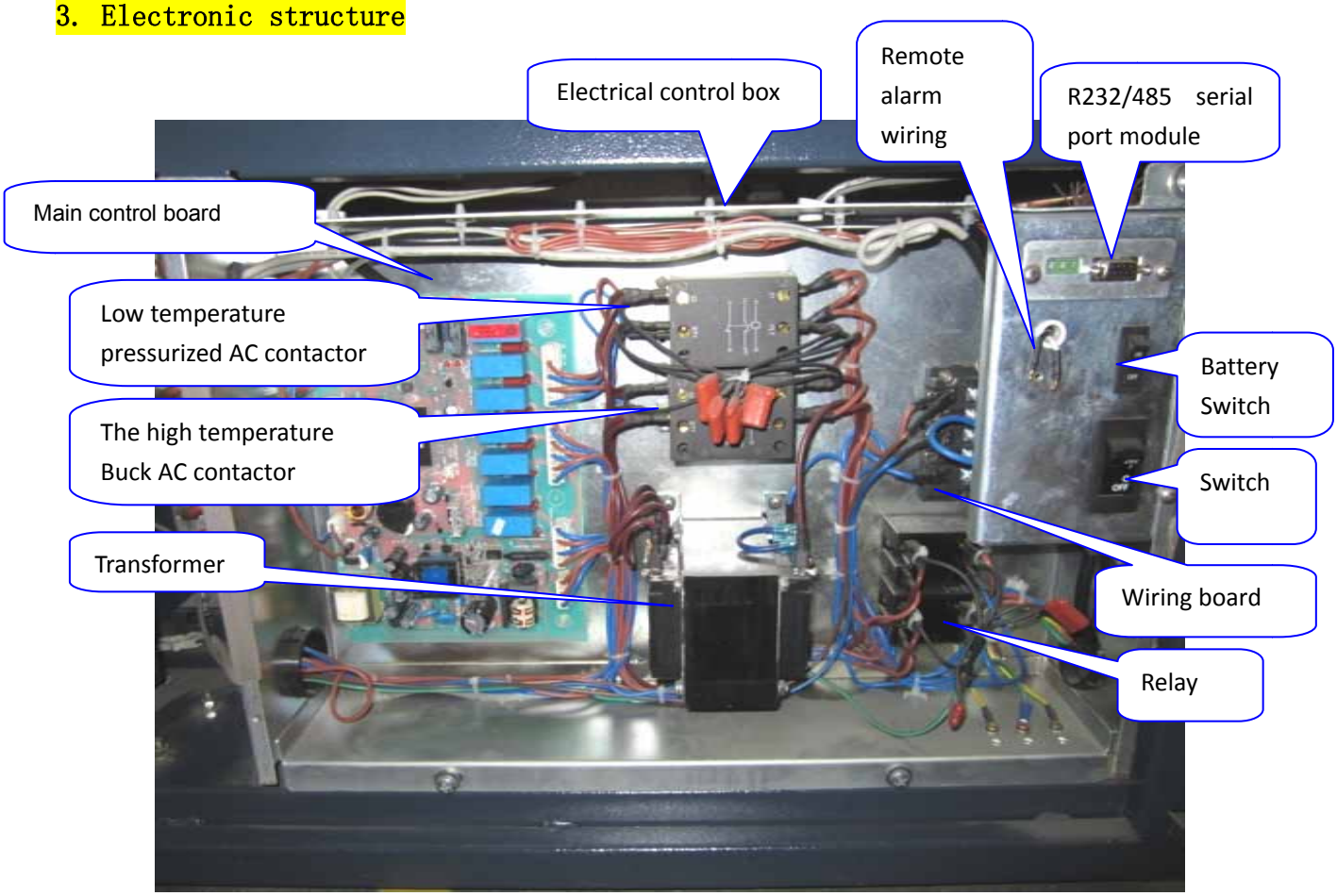
Inner door handle: replace dismantled handle the center of rotation of the screw
Cabinet mouth

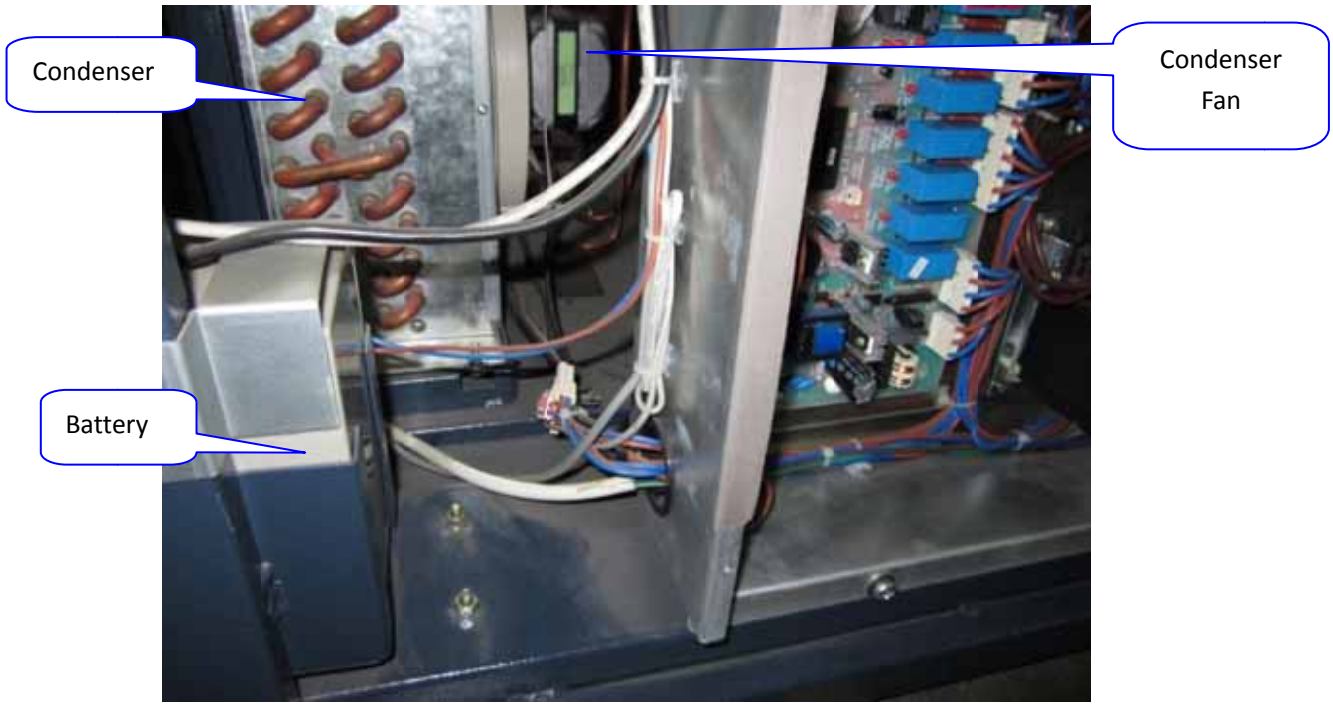

Test hole
CO2 backup system
Senser hole
Cabin guard plate
Power code

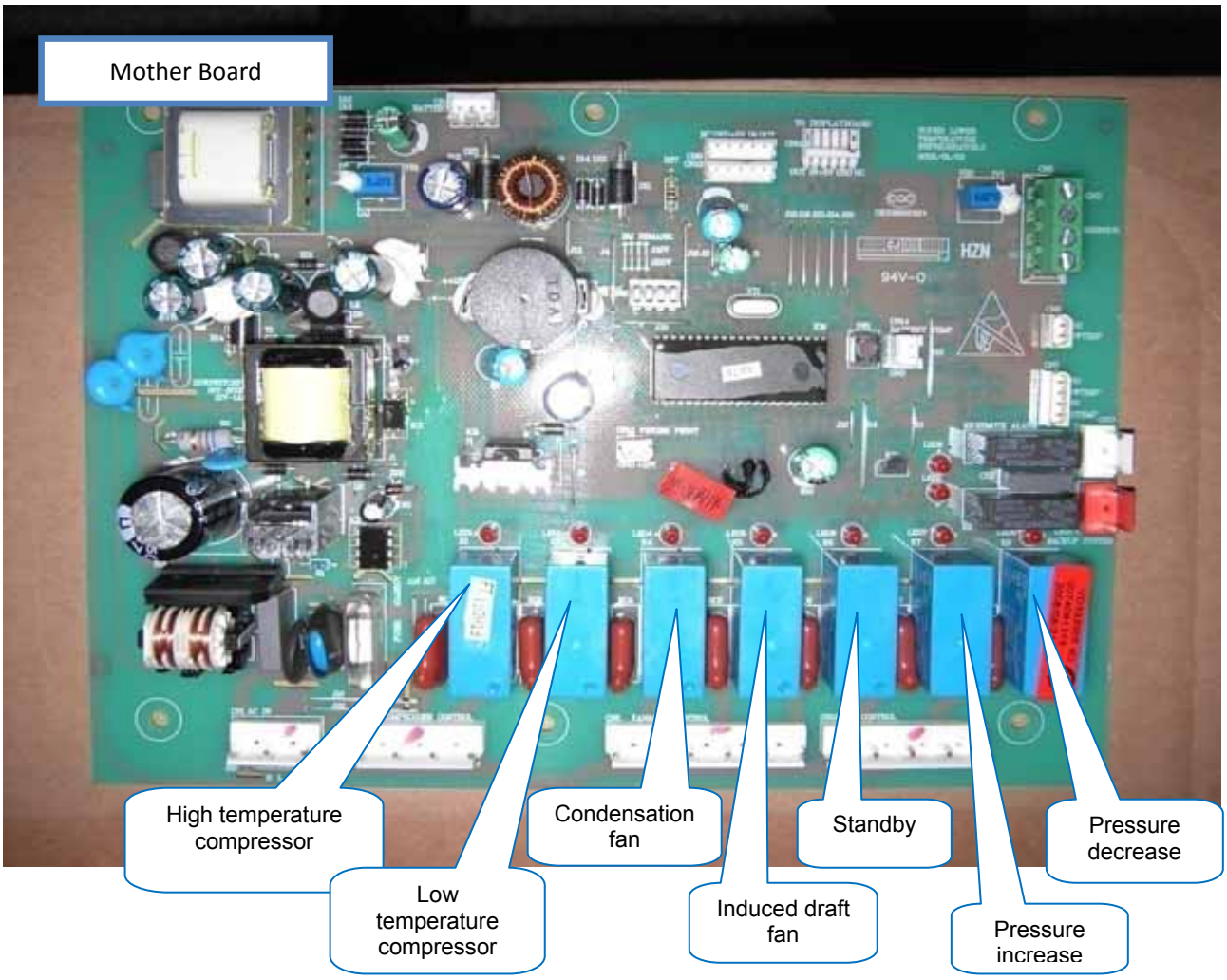
Door hinge (under)
Battery swtich
The cabin right guard
Power swtich

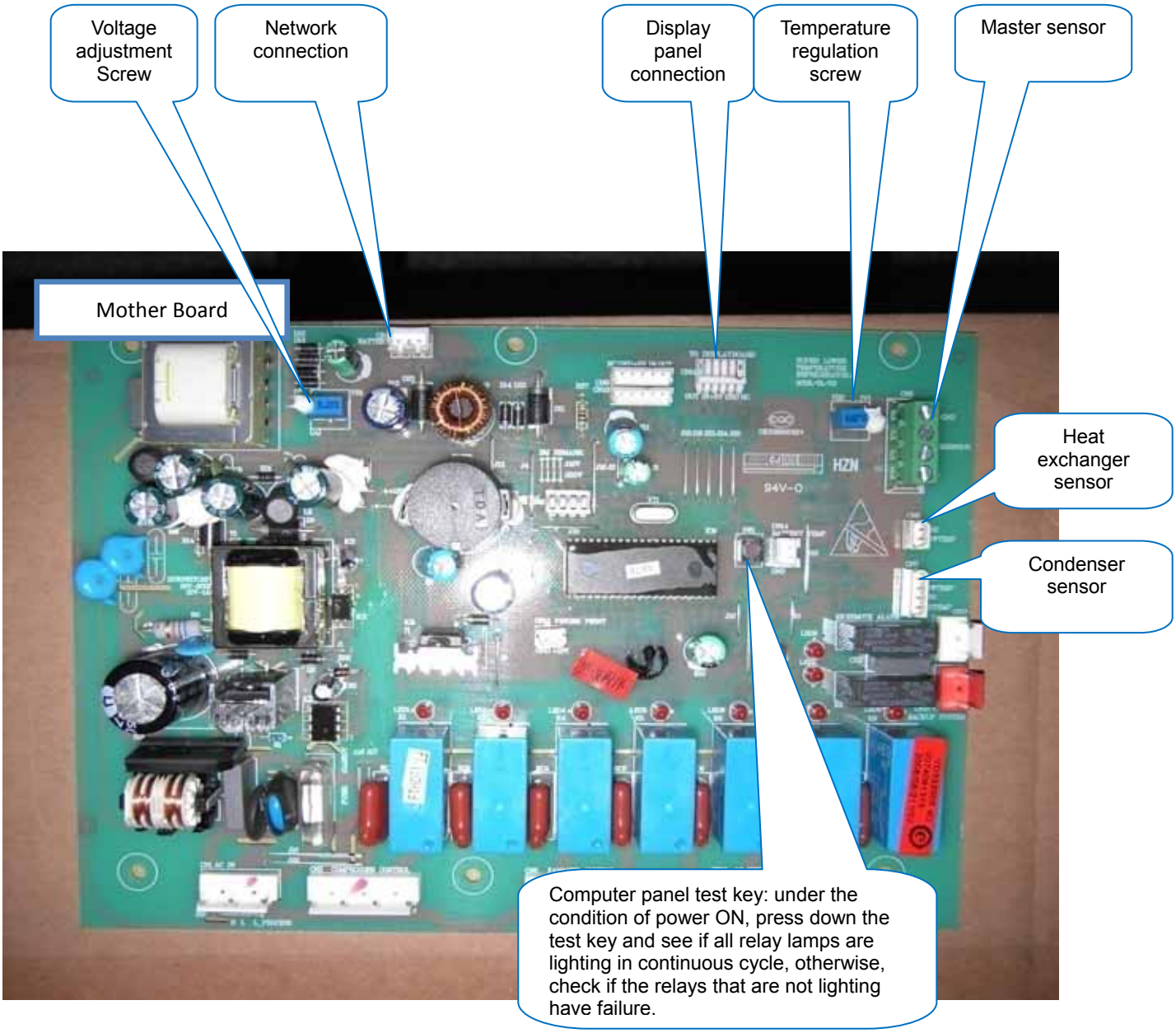

Nameplate and serial number
The cabin left guard

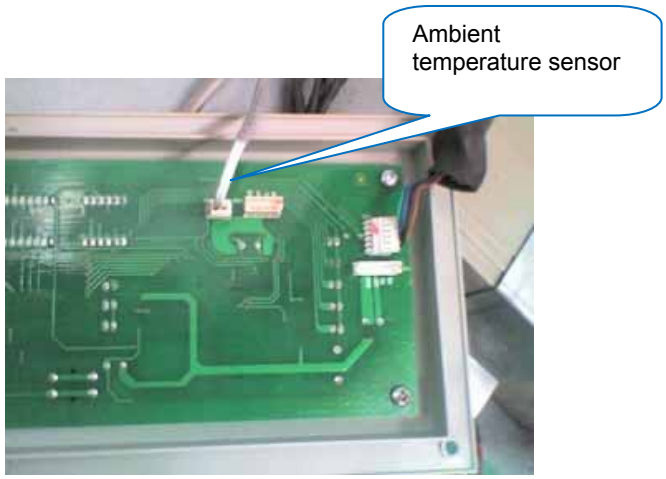
3. Electronic structure






Mother Board
High temperature compressor
Low temperature compressor
Condensation fan
Induced draft fan
Standby
Pressure increase
Pressure decrease


Voltage adjustment Screw
Network connection
Display panel connection
Temperature regulation screw
Master sensor
Mother Board
Heat exchanger sensor
Condenser sensor
Computer panel test key: under the condition of power ON, press down the test key and see if all relay lamps are lighting in continuous cycle, otherwise, check if the relays that are not lighting have failure.


Ambient temperature sensor

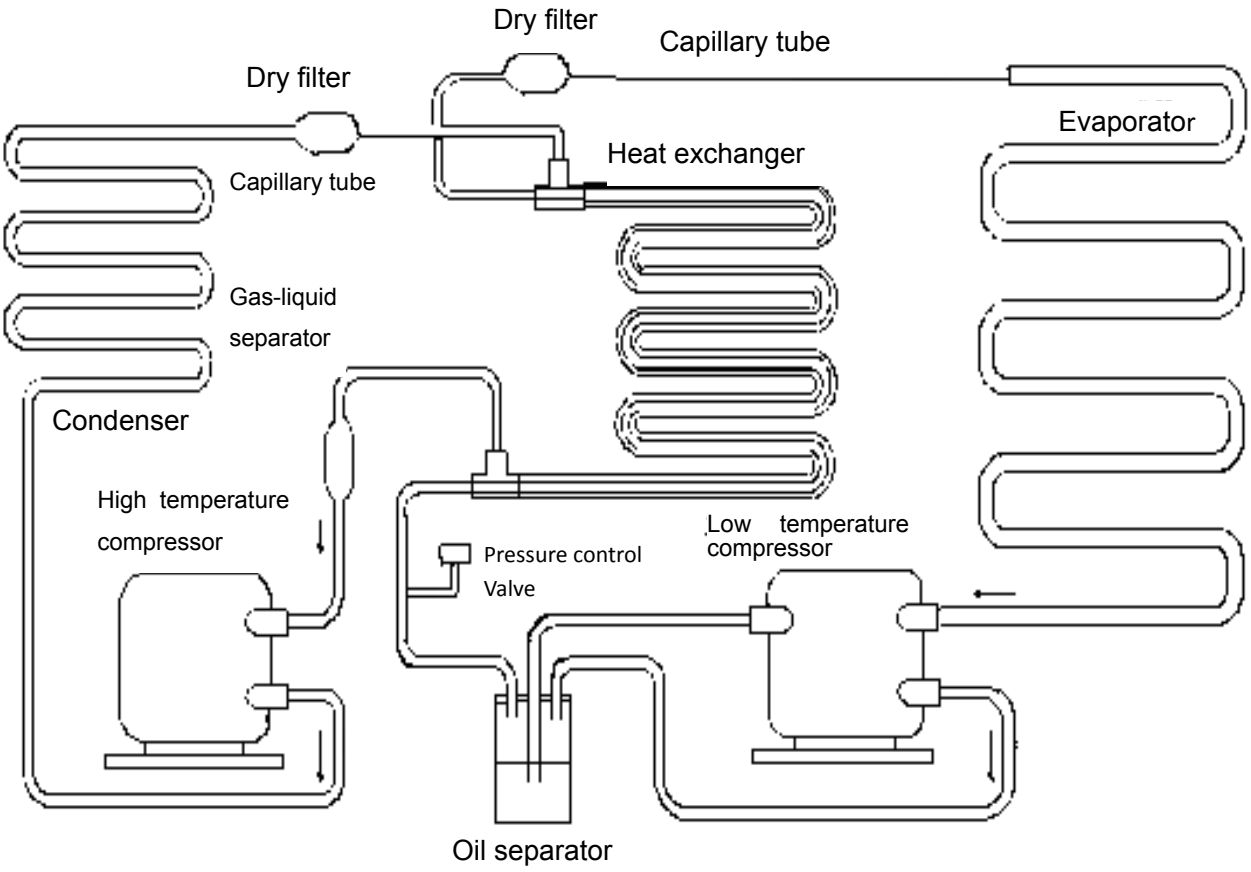
4. System architecture

【Cooling unit parts】

Part decripetion	parameter		
	Models	High temperature stage	Low temperature stage
compressor	DW-86L628/728/828	Escop/Danfoss GS26CLX	
power		220-240V/50Hz	
Start capacitance		117U5381（100uF）	
Run capacitance		117-7135（20uF）	
compressor	DW-86L628/728/828	Danfoss GS26CLX	
power		208-230V/60Hz	
Start capacitance		117U5381（100uF）	
Run capacitance		117-7138（20uF）	
compressor	DW-86L486/388/288/490/338/388A DW-86W420	Escop/Danfoss SC21CL	
power		220-240V/50Hz	
Start capacitance		117U5373（80uF）	
Run capacitance		117-7112（10uF）	
compressor	DW-86L628/486	Escop/Danfoss SC18CLX.2	
power		115V/60Hz	
Start capacitance		117U5043（410uF）	
Run capacitance		117-7114（23.5uF）	
compressor	DW-86L486/338/490	Escop/Danfoss SC18CLX.2	
power		208-230V/60Hz	
Start capacitance		117U5373（80uF）	
Run capacitance		117-7121（10uF）	
compressor	DW-86W100	Escop/Danfoss SC12CL	
power		208-230V/60Hz	
Start capacitance		117U5017（80uF）	
Run capacitance			
Refrigerant	In the nameplate	R134a R404a	R290 R508b
Refrigerant Oil	All the ULT-freezer	RH32H	
Evaporimeter	DW-86L486/388/288/490/628/	/	Φ9.52X0.8
Evaporimeter	DW-86L338/388A	/	Φ9.52X0.75
gas-liquid separator	All the ULT-freezer	0.130XΦ60X1.2	/
Fan motor	All the ULT-freezer	EBM M4Q045-CA03-51, AC230V/50/60Hz, 36/34W	
Display panel	All the ULT-freezer	Haier HY-DLB PCB-220V/120V	
Control board	All the ULT-freezer	Haier HY-DLB PCB-220V/120V	
Dry-filter	All the ULT-freezer	Danfoss DML 083S	
gas-liquid separator	All the ULT-freezer	/	Temprite 900G
condenser	All the ULT-freezer	Φ9.52X0.33	/
Aternating current	All the ULT-freezer	GC6-30S/11 H（220V50Hz/60Hz 45 FLA, 240 Vac）	
Relay	All the ULT-freezer	841-S-1A-D(AC250V, 25A, T60)	
Battery	All the ULT-freezer	12V7AH/12V4AH	
Transformer	All the ULT-freezer（except	P41-175-24 (SMY-080165)	

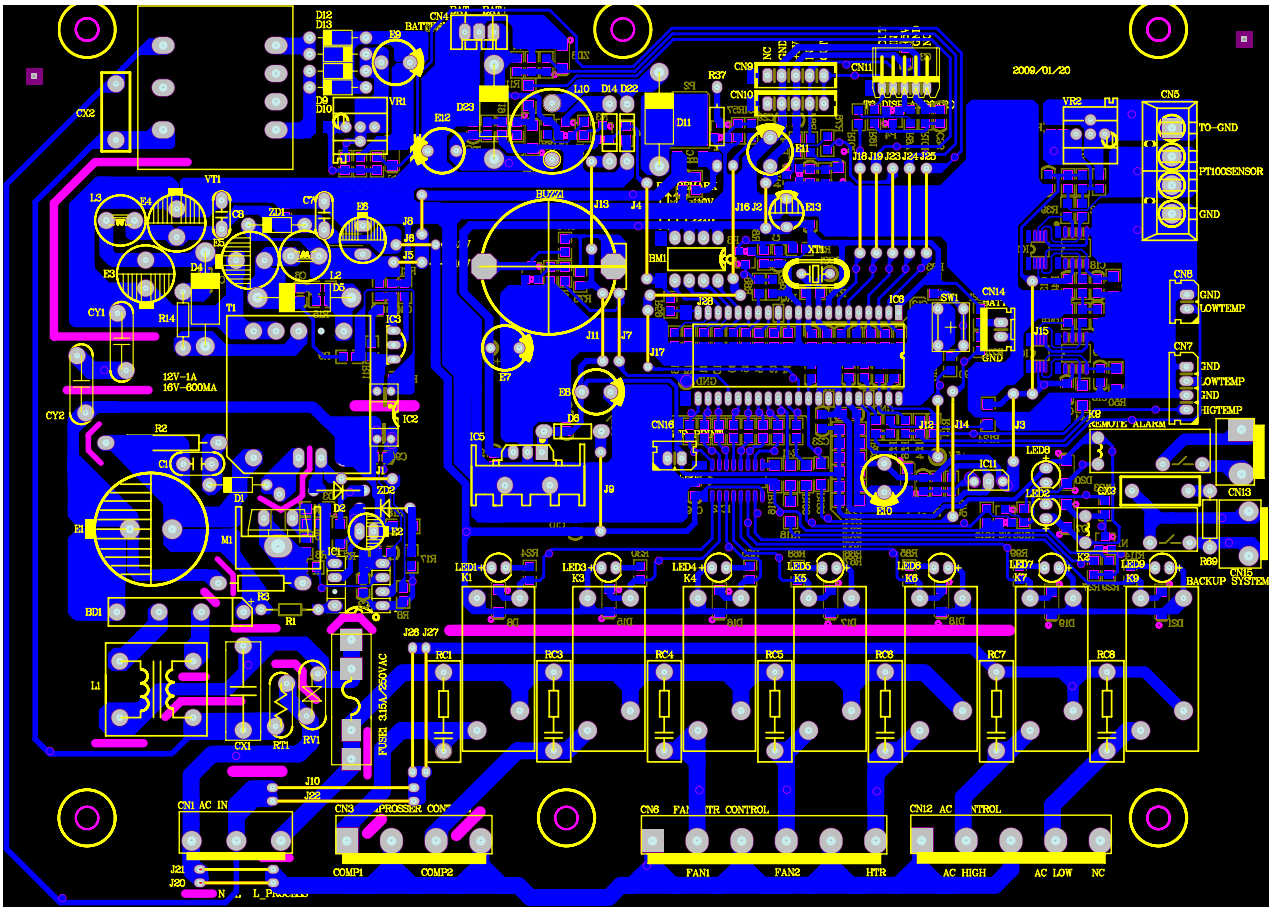
【Refrigeration circuits】

Diagram of refrigerating system

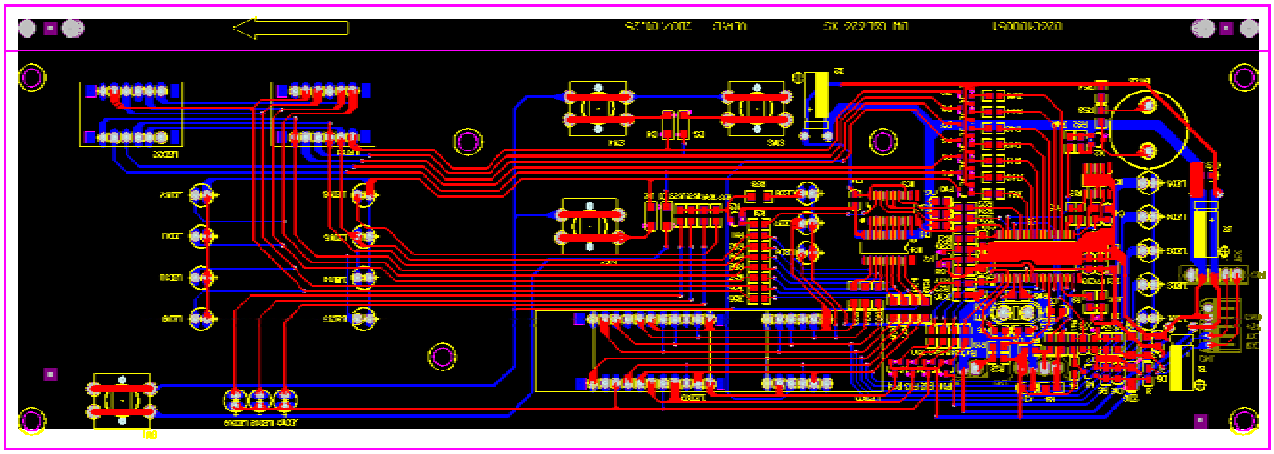


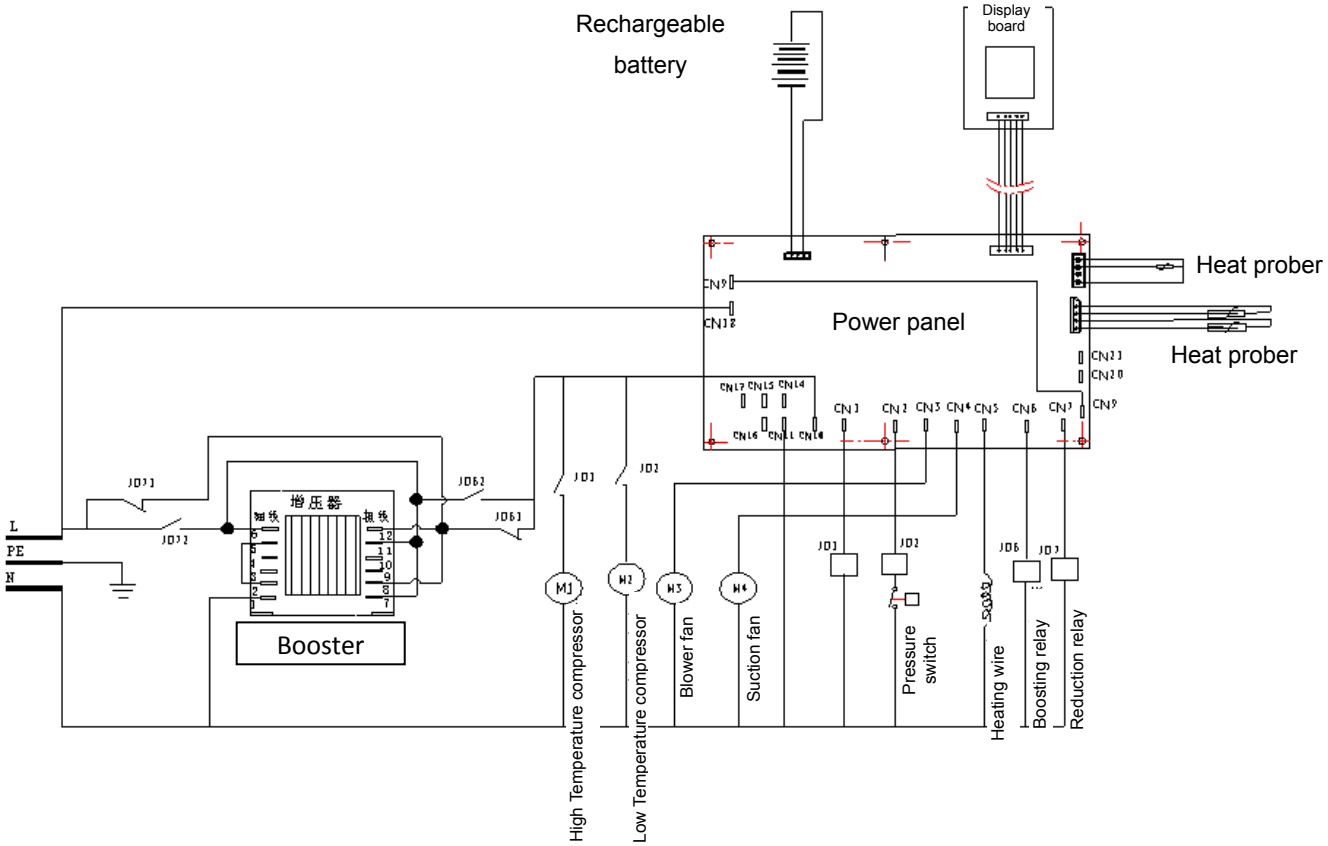
【 Circuit diagram】

Mother board



Display panel




Rechargeable
battery
Display
board
Heat prober
Heat prober
Power panel
Booster
L
PE
N
High Temperature compressor
Low Temperature compressor
Blower fan
Suction fan
Pressure
switch
Heating wire
Boosting relay
Reduction relay

【Connections on Main PCB】

Connector	Connect to	Usage
CN1	wiring board	Power supply
CN3	Compressor realy	Control compressor
CN4	battery	Battery power
CN5	Main sensor	Main sensor
CN6	Two fans and heater	Control fans and heater
CN7	Condenser sensor	Condenser sensor
CN8	Heat exchanger sensor	Heat exchanger sensor
CN9	For display panel	backup
CN10	For display panel	backup
CN12	AC cantactor	Control the voltage
CN13	remote alarm	remote alarm
CN15	Backup system	Backup system control
CN18	Display panel	Control display panel

【Specifications of sensor】

1. The value of the probe resistance varies with temperature (probe type: NTC)

temperature （℃）	Resistance （KΩ）	temperature （℃）	Resistance （KΩ）	temperature （℃）	Resistance （KΩ）	temperature （℃）	Resistance （KΩ）
-40	63.3	-19	17.8	2	5.8	23	2.1
-39	59.4	-18	16.8	3	5.5	24	2.0
-38	55.8	-17	15.9	4	5.2	25	1.9
-37	52.3	-16	15.0	5	5.0	26	1.8
-36	49.2	-15	14.2	6	4.7	27	1.8
-35	46.2	-14	13.4	7	4.5	28	1.7
-34	43.4	-13	12.7	8	4.3	29	1.6
-33	40.8	-12	12.0	9	4.1	30	1.5
-32	38.4	-11	11.4	10	3.9	31	1.5
-31	36.1	-10	10.8	11	3.7	32	1.4
-30	34.0	-9	10.2	12	3.5	33	1.4
-29	32.0	-8	9.7	13	3.4	34	1.3
-28	30.1	-7	9.2	14	3.2	35	1.2
-27	28.4	-6	8.7	15	3.1	36	1.2
-26	26.7	-5	8.3	16	2.9	37	1.1
-25	25.2	-4	7.8	17	2.8	38	1.1
-24	23.8	-3	7.4	18	2.7	39	1.0
-23	22.4	-2	7.1	19	2.5	40	1.0
-22	21.2	-1	6.7	20	2.4	41	1.0
-21	20.0	0	6.4	21	2.3	42	0.9
-20	18.9	1	6.1	22	2.2	43	0.9

2. The value of the probe resistance varies with temperature (probe type: PT100)

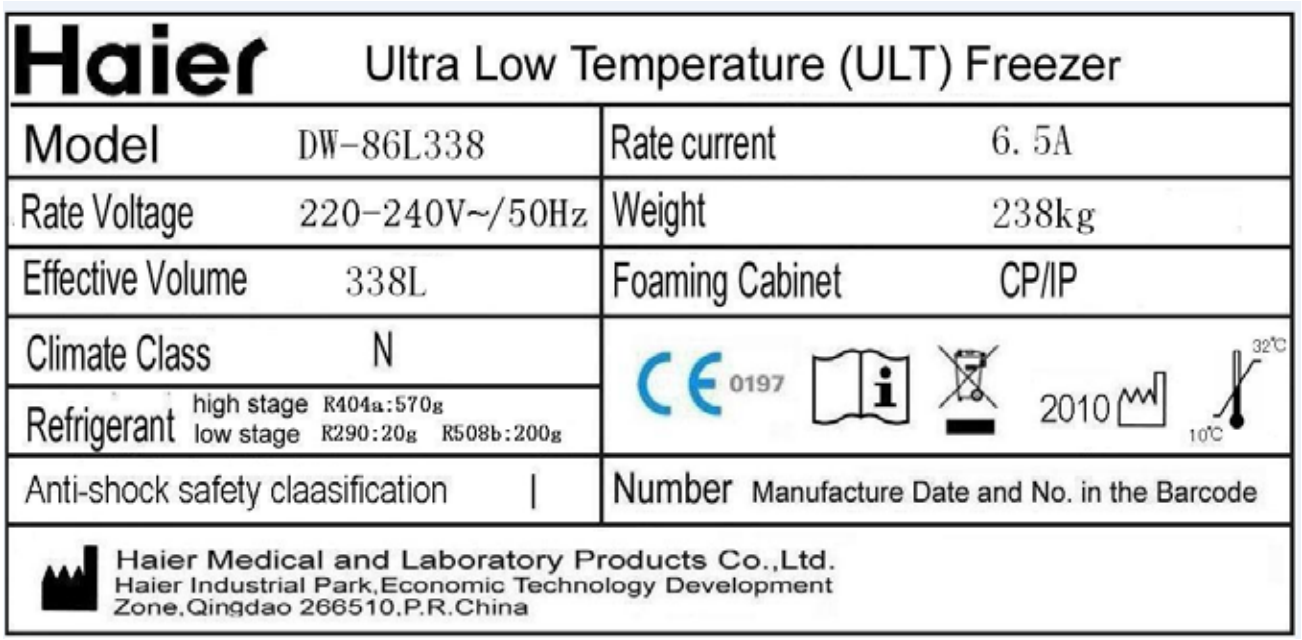
temperature （℃）	Resistance （KΩ）	temperature （℃）	Resistance （KΩ）	temperature （℃）	Resistance （KΩ）	temperature （℃）	Resistance （KΩ）
-130	48	-80	68.3	-30	88.2	20	107.8
-120	52.1	-70	72.3	-20	92.2	30	111.7
-110	56.2	-60	76.3	-10	96.1	40	115.5
-100	60.3	-50	80.3	0	100	50	119.4
-90	64.3	-40	84.3	10	103.9	60	123.2

【Detailed technical data of the product】

Type	Effective volume(L)	Rated voltage	Input power(W)	Overall dimensions (depth*width*height) (mm)	Inner dimensions (depth*width*height) (mm)	Compressor	Inner door
DW-86L288/286	288/286L	220V50Hz	930W	1641*915*870	971*620*550	SC21CL	3
DW-86L388/386	388/386L	220V50Hz	1000W	1980*915*870	1310*620*550	SC21CL	4
DW-86L628/626	628/626L	220V50Hz	1200W	1980*1035*900	1310*760*630	GS26CLX	4
DW-86L728	728L	220V50Hz	1200W	1980*1145*900	1310*870*630	GS26CLX	4
DW-86L828	828L	220V50Hz	1200W	1980*1145*980	1310*870*710	GS26CLX	4
DW-86L338	338L	220V50Hz	900W	1866*812*893	1165*465*630	SC21CL	2
DW-86L490	490L	220V50Hz	1100W	1980*860*900	1310*590*630	SC21CL	4
DW-86L486	486L	220V50Hz	1000W	1980*945*900	1310*590*630	SC21CL	4

【product nameplate】

For example: DW-86L338



Haier	Ultra Low Temperature (ULT) Freezer		
Model	DW-86L338	Rate current	6. 5A
Rate Voltage	220-240V~/50Hz	Weight	238kg
Effective Volume	338L	Foaming Cabinet	CP/IP
Climate Class	N	CE 0197 2010	
Refrigerant	high stage R404a:570g low stage R290:20g R508b:200g		
Anti-shock safety claasification	I	Number	Manufacture Date and No. in the Barcode
Haier Medical and Laboratory Products Co.,Ltd. Haier Industrial Park,Economic Technology Development Zone,Qingdao 266510,P.R.China			

【Transportation and Installation】

1. Transportation of the product and removal of package

1.1 Transportation: the product is heavy, so fork or hydraulic jack will be used during transportation, to avoid damaging the personnel and product.

1.2 Removal of package: packing method of the product: wooden support+EPE During transportation, the fork or hydraulic jack is required to insert into the bottom of the wooden support to transport the product.

Packing scheme is shown as the following figure:

Notes: Removal of packing refers to “Single Page for Removal” sticked to the inside of packing carton. Please note that the connecting pieces front and rear must be removed before the wooden support is taken out.

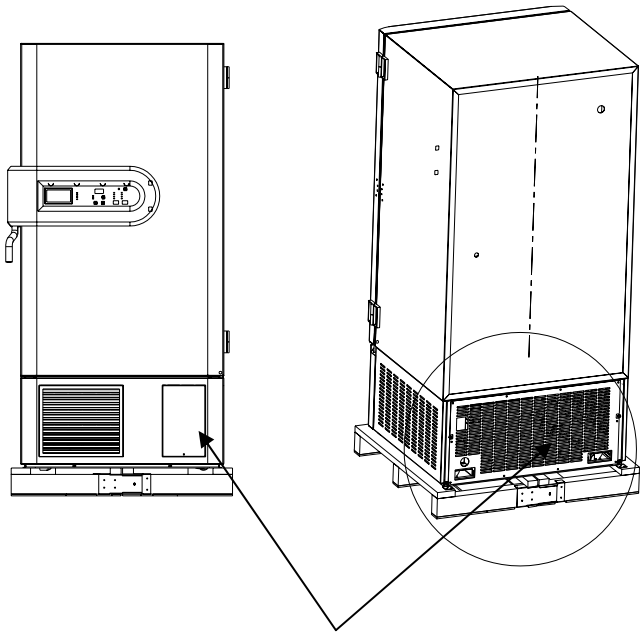


Figure 1: Connecting pieces of the wooden base

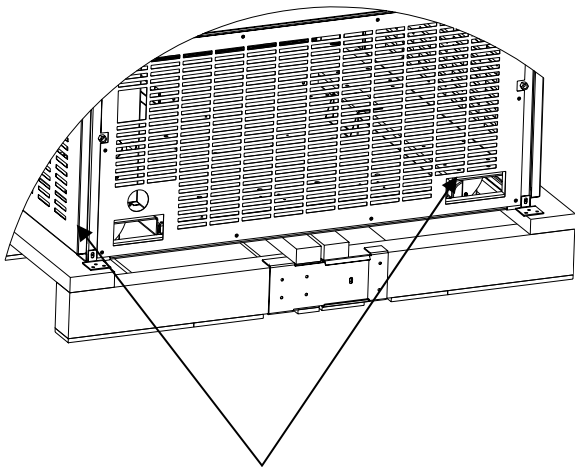


Figure 2 Fastening pieces of low temperature cabinet

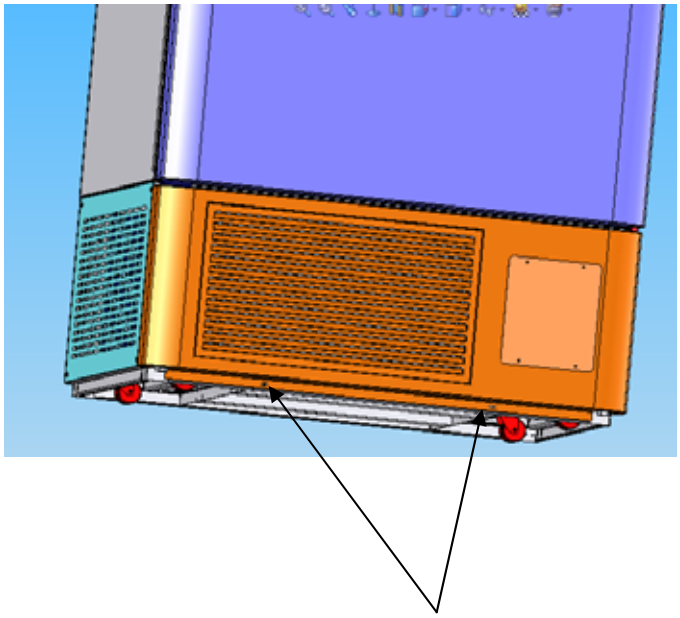
2. The product enters the placement room

2.1 It is difficult to enter the door: if the product can't enter the room height required by the client and its access is unavailable without the bottom base, the front cover of the cabinet can be removed and open the door to 180 degree. Removal of the front cap of cabinet and the notes for attention are shown as:

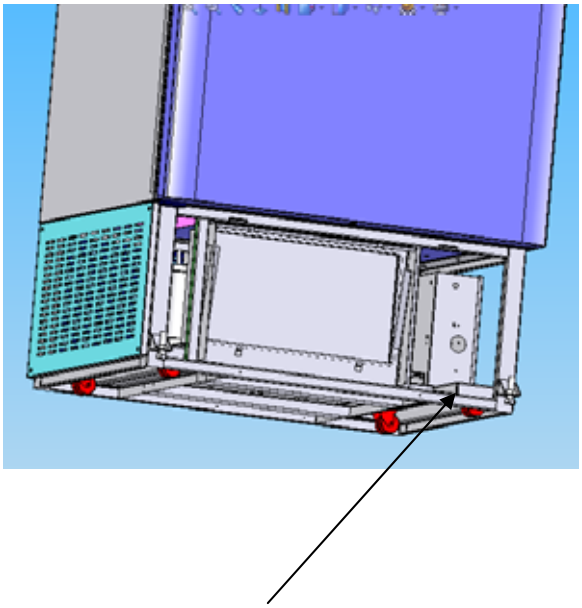
Notes: In general, we don't recommend removing the front cap of cabinet.

2.2 ①Remove two screws below the front cap of cabinet.

②Remove the front cap.



Remove two screws of front cap of cabinet



remove the front cap of cabinet

③Open the outside door to 180 degree

④After the product enters the room; install the front cap of cabinet as original.

Notes: The installation must be in position, otherwise the safety or performance problem will be caused!

Notes: During the transportation, the storage box shall be avoided being impacted or scratched. The maximum inclination angle shall not 45° when handling (the included angle with the horizontal direction), so as not to produce the fault to refrigerating system or influence its normal use.

3. Product installation and matters needing attention

3.1 Installation site of the product

①avoid the direct sunshine

②good ventilation around the site

③avoid a collection of dust

④avoid the mechanical swing or vibration

⑤Ambient temperature:5℃-28℃，the maximum temperature shall not exceed 32℃，and the optimal temperature will be 18℃-25℃. If necessary, the air conditioning system will be used.

⑥Height of the working position of the equipment: less than 2000m

⑦Operating humidity: less than80%RH. If the maximum operating temperature is 32℃， the humidity shall be less than 57%RH.

⑧Input voltage: Within 220±10%.

Notes: Because the ultralow equipment is sensitive to the ambient temperature, if the machine can't operate normally if it is installed in the environment other than the above ones, then it can be applied again after the environment is improved.

3.2 Matters needing attention of the product

①At least a 20cm clearance shall be reserved between the wall and the back of equipment

②Ground of the installation site must be level, whose ambient temperature shall not exceed 30℃. ③The equipment shall be applied under an environment of 25℃. If the temperature is too high, then the air conditioner is required for solution.

④Fix the machine well with fixed bolts.

⑤Good ventilation indoor.

⑥Don't' use the same socket with the plug of other equipment, the plug and socket must be connected securely.

⑦Please note that the power line shall not be twisted or pressed.

⑧If the wire shall be lengthened, standard of the feeder line will be 230V and 15A, and the lengthened part shall not exceed 3m.

⑨The equipment is especially used for 208~230V，50/60Hz power. Please check the operating voltage before use, if it is lower than 180V, then the transformer will be used to boost, and the total transformation power shall be greater than 3kW. When the voltage is higher than 230V, the transformer will be used to reduce the voltage. For the areas with unstable voltage, the stabilizer shall be applied, to guarantee the normally input voltage to be stabilized at 220V±10%. Power of the stabilizer shall be greater than 3kW.

⑩The equipment must be guaranteed to reliably ground.

⑪If the power plug is equipped with the earth wire; please check its output before use.

⑫If the socket hasn't any earth wire, firstly connect the earth terminal of the equipment to the earth wire, then connect the other end of the earth wire to a copper plate, finally bury it

underground.(burial depth is 25cm at least).

Notes: The earth wire shall not be connected to the gas pipe, telephone line or lighting line.

3.3 Method of application after completion of installation

For the ultralow temperature cabinet firstly used, or after the ultralow temperature cabinet is handled, or the ultralow temperature cabinet experiences power failure (including outage) for more than 10 hours, then the equipment must be verified before use (or before energization) . The verification shall confirm that

①The equipment shall be energized only after the refrigerator has been rested for more than 24h.

②The articles shall not be put in the empty cabinet. Turn on it after energization, and then cool it by stages. Firstly cool it to -40℃, then to -60℃ after normal startup and shutdown. Then cool to -80℃ 8 hours after its normal startup and shutdown. Observe the refrigerator for normal startup and shutdown for over 24h, to prove its normal performance.

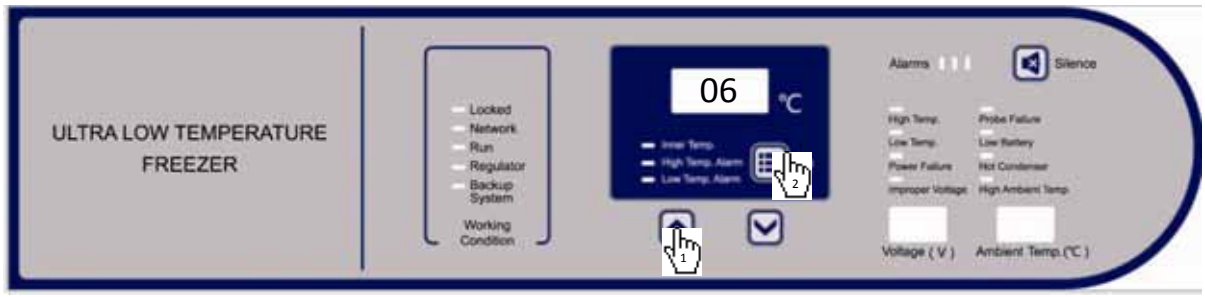
③After the refrigerator is confirmed to be normal as per ②, and then the articles can be put in it. In principle, the articles stored at -60℃ shall not exceed 1/3 volume. If temperature of the articles stored exceeds -60℃, then the temperature of refrigerator shall be set at a temperature higher 3℃ than that of the articles stored (that is to say if the material temperature is -20℃, then the temperature of the refrigerator shall be set at -23℃). The refrigerator shall be guaranteed to normally startup and shutdown for more than 8 hours.

Prohibitions: All low temperature storage boxes shall be low temperature store equipment, which is used to store low temperature articles, but not to freeze the high temperature blood plasma. It is forbidden to store so many relatively hot articles the equipment. The articles must be placed into the refrigerator in batches, and cooled by stage temperature, until reach the low temperature required!!!

If the client needs a freezing equipment to freeze the blood plasma within a short time, presently we specially develop a kind of urgent refrigerator, which can meet the client's need in blood freezing.

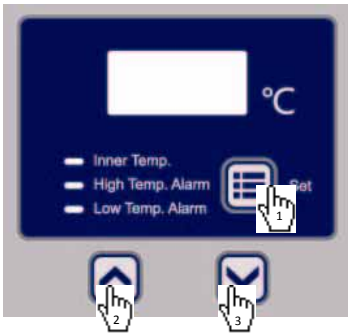
【Specifications of LCD panel】

1. Unlock



For adjusting the setting values, firstly they must be unlocked. Press "△"or"▽", temperature setting values will flash, press "△"or"▽", and input the number 06, then hold "Function Selection" for 5 seconds, "Lock" lamp goes out, to enter unlock status. After that the settings as follows can be done, press "Function Selection" to repeatedly choose temperature set, high temperature alarm set and low temperature alarm set inside the refrigerator, and the corresponding indicating lamps will be lighten.

2. Temperature setting



For "Temperature Set", the display area will flash, to display the temperature setting value. At this time, press "△" and "▽" to change the setting values. If no operation is done within 10 seconds after adjustment, then it will enter locking status automatically. If temperature display flashing stops, it shows that the values have been input to the computer, otherwise they are invalid. Temperature setting range will be -10~-86℃.

3. High Temperature Alarm

When set “High Temperature Alarm”, if temperature set display area flashes, it indicates the temperature setting value, at this time press shifting and adjusting key to adjust the alarm setting value. If no operation is done within 10 seconds after adjustment, then it will enter locking status automatically. If temperature display flashing stops, it indicates that the values have been input to the computer, otherwise they are invalid. The temperature set shall not exceed the maximum limit temperature or be less than the setting temperature by +5℃ when setting the high temperature

4. Low Temperature Alarm

When setting “Low Temperature Alarm”, if setting temperature display area flashes, it indicates that the temperature setting values. At this time, press “△”and “▽”to adjust the alarm setting value. If no operation is done within 10 seconds after adjustment, then it will enter locking status automatically. If temperature display flashing stops, it indicates that the values have been input to the computer, otherwise they are invalid. The temperature set shall not exceed the maximum limit temperature or be less than the setting temperature by -5℃ when setting the high temperature; otherwise the setting can’t be realized.

【Indicating of working status of display panel】

1. The refrigerator will enter starting status after it is switched on, and all parameters on the display screen will be saved as those before the last power interruption. The displayer will display the actual temperature, setting temperature and current voltage.

Indication of working status of the display panel:

"Lock" indicating lamp: if the lamp lights, indicating all settings are locked, to prevent misoperation.

"Network" lamp: if it lights, indicating the network system has been in operating status.

"Operating" lamp: if it lights, indicating the compressor is operating.

"Stabilization" lamp: if it lights, indicating the voltage booster is boosting or reducing the voltage.

【115V】 When the refrigerator is applied to 115V circuit, when the input voltage drops to 98V, the booster will be connected to boost. When the input voltage increases to 113V, the booster will be disconnected, with boosting amplitude 12V; when the input voltage increases to 125V, the booster will be connected to reduce voltage. When the input voltage drops to 120V, the booster will be disconnected, with reduction amplitude 12V. When the input voltage drops to 95V, the compressor is in operating for a long time, without shutdown. The alarm lamp flashes, free from buzz alarm; when the input voltage increases to 136V, the compressor will operate as per the normal procedure, at the same time the alarm lamp flashes, free from buzz alarm.

【220V】When the refrigerator is applied to 220V circuit, when the input voltage drops to 200V, the booster will be connected to boost. When the input voltage increases to 210V, the booster will be disconnected, with boosting amplitude 12V; when the input voltage increases to 230V, the booster will be connected to reduce voltage. When the input voltage drops to 215V, the booster will be disconnected, with reduction amplitude 12V. When the input voltage drops to 184V, the compressor is in operation for a long time under no shutdown. The alarm lamp flashes, without buzz alarm; when the input voltage increases to 253V, the compressor will operate as per the normal procedure, at the same time the alarm lamp flashes, without buzz alarm.

"Backup system" lamp lights, indicating the system is in operating status.

【Indication of alarm status】

"High temperature" indicating lamp: if the lamp lights, indicating the alarm display when the temperature inside the refrigerator is higher than the setting value.

"Low temperature" indicating lamp: if the lamp lights, indicating the alarm display when the temperature inside the refrigerator is lower than the setting value.

"Over voltage" lamp lights, indicating the voltage is lower than 184V (95V) or higher than 253V (136V), buzzing.

"Too high ambient temperature" indicating lamp: if the lamp lights, indicating the ambient temperature is higher than 32℃.

"Sensor fault" indicating lamp: if the lamp lights, indicating the sensor has faulted.

"Power interruption" indicating lamp: if the lamp lights, indicating the interruption of power line.

"Dirty condenser" indicating lamp: if the lamp lights, indicating the condenser is blocked by dirt, and needs to be cleaned. When it is felt that the difference between the condenser and the ambient temperature is greater than or equals 13℃ (after 5 minutes later), "dirty condenser" indicating lamp lights, accompanied by the buzzer alarm.

"Low battery" indicating lamp: if the lamp lights, indicating the low battery and will be charged; when the battery is connected to AC power, the low temperature refrigerator will charge it automatically.

【Notes】 When all alarms appear, light alarm signal will immediately flash to alarm as well as the high and low temperature alarm information. 15 minutes after light flashing, the buzzer begins to send alarm by voice; for the alarm information on power interruption and overvoltage, the buzzer beings to send alarm by voice after the light flashes for 1 minute. Under the power interruption, the display appears black screen, without any other information displayed, and the alarm lamp operates under alarm mode. After the black screen lasts for 30 seconds, the display panel will normally display for 5 seconds, and alternatively display as per this mode. For alarm information on dirty condenser, when the light flashes, the buzzer and the voice will send alarm at the same time; for that on low battery, light flashing alarm is available, without buzzer alarm; for that on too high

ambient temperature, when the ambient temperature exceeds 38℃ (excluding 38℃), “too high ambient temperature” indicating lamp in the alarm display area will light and send alarm, accompanied with buzzer alarm. Light flashing alarm can’t be cancelled, until the fault is removed. While the buzzer audible alarm can be silent when press “buzzing cancel”, with mute period of 30 minutes. 30 minutes later, the buzzer audible alarm will be started again.

【Setting of special functions】

1. Setting of password value

When the low temperature refrigerator is firstly used, unlock password is 06. After unlocking, press “Function Selection” and “Buzzer Cancel” for 5 seconds simultaneously, 06 will be displayed on the display, then press “▲” and “▼”to adjust the password values. Password value can be chosen among 05, 06, 07……29, 30. No operation will be done within 5 seconds after the password value is set, then it will enter the lock status automatically, indicating the password value set is valid. When unlock the password value, the display figures can be displayed among 01, 02, 03……98, 99.

2. Setting of start delay

Under the unlock status, press and hold down “Function Selection” and “▽”for 5 seconds at the same time. Start delay of high temperature compressor is 01 (1 minute) when the display indicates that the equipment is energized, then the start delay can be set as 01, 02, 03------09, 10 (1 minute -10 minutes) by pressing “△ “or” ▽ “. The default delay is 1 minute.

3. Calibration function

Under the unlock status, press and hold down “Function Selection” for 5 seconds. Temperature calibration value will be displayed on screen display area, at this time, the difference between display temperature and that at the special point inside the refrigerator will be calibrated. For example, display temperature is -80℃ and temperature at a special point is -75℃, then +5℃ can be input to change the display temperature into -75℃, therefore the calibration range is ±5℃.

4. Control of condensate fan

When the compressor is turned on, the two fans also will be turned on; when the two compressors are turned off, the two fans will depend on the following conditions for on or off: when the ambient temperature is higher than 20℃, the two fans will be turned on; when it is lower than 20℃ (except for 20℃), one fan will be turned off and the other will be turned off; when the ambient temperature is lower than 12℃ (except for 12℃), the

two fans will be turned off.

5. Requirements of battery control

There is a battery power switch on the equipment, which will be turned on before normal start. The equipment will enter normal operating status only it is connected to AC power satisfying the equipment requirement. When AC power can provide the normal power supply, the equipment can charge the battery as required. When AC power is interrupted due to accident, the battery can supply the display screen, to realize normal display. When the battery discharge is less than or equals 10.5V, then the battery will stop supplying the display screen, without any display. If the power will be completely disconnected when the battery can provide the normal power, it only needs to pull out AC power wire and shut off the battery on equipment, and nothing will be displayed on the display screen.

6. Meanings of fault codes

When there is any trouble with the sensor, “Sensor Fault” indicating lamp lights

①When the main sensor has any trouble, actual temperature will be alternatively displayed on the display screen and the code is E2.

②When the condenser has any trouble, actual temperature will be alternatively displayed on the display screen and the code is E1.

③When the ambient temperature sensor has any trouble, actual temperature will be alternatively displayed on the display screen and the code is E0.

④When the heat exchange sensor has any trouble, actual temperature will be alternatively displayed on the display screen and the code is E3.

⑤When temperature of the heat exchanger picked up by the sensor≥90℃, the alarm displays E4.

⑥During alarm testing, when the battery switch isn’t connected or the battery is low,

display fault on the display screen is E5.

Alternate display time: the actual temperature display is 6 seconds and fault code display is 2 seconds (since Nov. 2009).

7. Precautions

7.1 After initial installation or moving equipment, clockwise rotation of the horizontal leg horizontal feet support the ground to ensure that the freezer does not move when you use need to stand for 24 hours after the power use after you install the fixed place

7.2 The room temperature should be kept below 28 ℃ (If the ambient temperature is higher than 32, the cooling efficiency will decline rapidly, and ambient temperature for a long time is higher than 32 may result in compressor damage or reduced life, therefore, to use the product environment is recommended to install air conditioning)

7.3 Single piece of equipment should be independent and use a socket and power socket withstand current should be greater than 16A, and reliable ground

7.4 Energized when you first open the battery switch on the machine electrical control box, take a long time to shut down the power to turn off this switch.

7.5 The cryogenic refrigerator door every time the time to try to not more than 1 minute, before closing the door seals on the ice water to wipe clean to ensure good sealing effect.

7.6 In order to extend the useful life of equipment and reduce energy consumption, use, under the premise of ensuring the security of stored items; it is recommended that the temperature of the device is set between -50℃~-80℃ optimal.

7.7 The device uses chilled goods, and should not be used as quick-frozen box cannot force rapid freezing a lot more hot items or large volume liquid items.

7.8 If energization 2-3 hours after the machine is not cooling, please unplug the power, and as soon as possible and after-sales contact.

7.9 Eliminated in accordance with the display panel prompts encountered alarm malfunction or other failure, malfunction, such as silent or not self-troubleshooting, please do not attempt to disassemble, contact the after-sales, professional maintenance staff to help eliminate the fault.

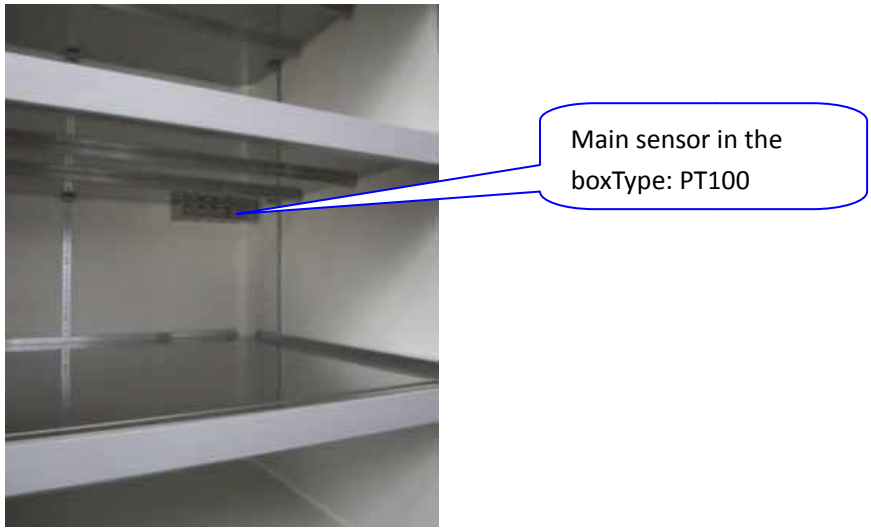
【Fault code】

The main fault codes

①Perception condenser temperature minus ambient temperature difference ≥ 13 ° C (for five minutes), the condenser is dirty "indicator light, and accompanied by a buzzer alarm, the initial on electricity within two hours, the indicator and buzzer not alarm

② When the sensor failure, sensor failure indicator light

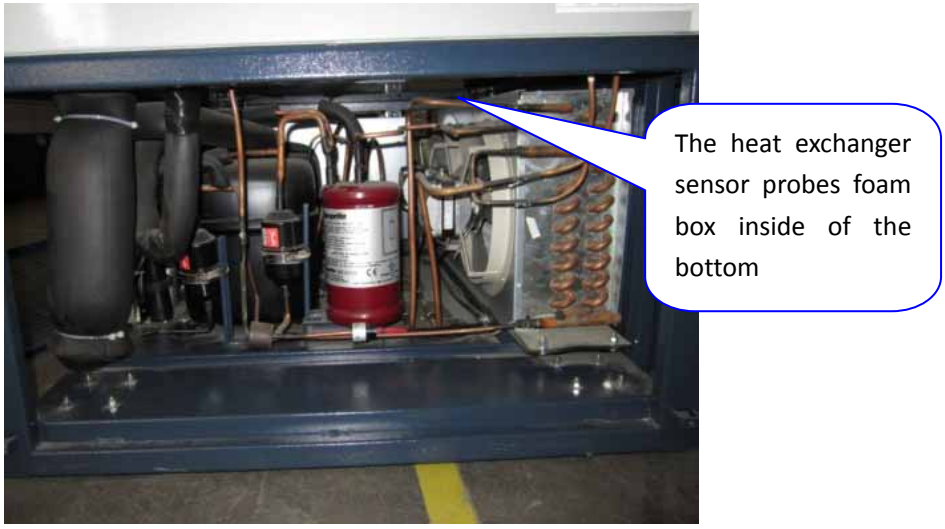
③When the main sensor failure, the display alternately shows the actual temperature and the main sensor fault code "E2"

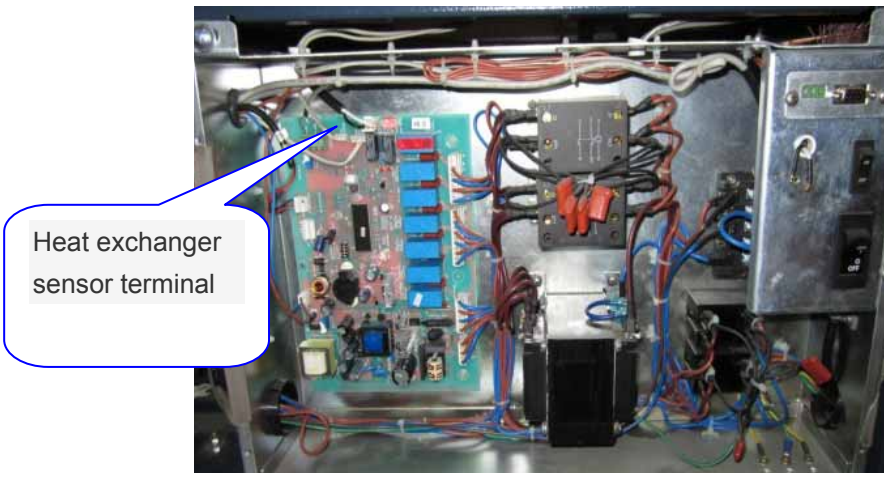


④When condensation sensor fails, the display alternately shows the actual temperature and the main sensor fault code "E1"

⑤When the ring temperature sensor failure, the display alternately shows the actual temperature and the main sensor fault code "E0".

⑥When heat exchanger sensor failure, sensor fault code in the display alternately shows the actual temperature and the heat exchange "E3". Select -86 "E3" failure, "E3" fault disappears after the buzzer canceled 5 seconds, long press "E3" fault display, boot, when the high temperature level press start, the Low Temperature pressure machine delay start 1 minute.





⑦When heat exchanger sensor senses the temperature ≥ 90 ℃, alarm display E4

Remarks: (Model -25 ° C and -50 ℃ heat exchanger sensor so no E3, E4, fault)

(Model: independent backup system no E0, E1, E3, E4 fault)

Alternately display time: the actual temperature display 6 seconds, the fault code is displayed for 2 seconds.

【Product use and maintenance】

1. Principle of work:

The design of overlaying-type freezing medium system is used for freezing mediums with different boiling points; this system needs two independent cooling systems. It is shown as above, each system can work synchronously; first level system is used for the high temperature section of second level cooling. Second level is the main system, which is used to maintain the temperature in low temperature cabinet. Freezing medium is compressed by first level compressor and condensed by condenser, and then dried by dryer. After passing through capillary tube, dried freezing medium becomes evaporated gas (low temperature and low pressure). Heat exchanger is cooled to below -20℃, which is used for carrying out condensation on second level system gas. Filter eliminates impurities in freezing medium, freezing medium goes through liquid separator, which can prevent liquid freezing medium from being absorbed into compressor. This is an integrated high temperature system refrigerating cycle.

After freezing medium is compressed by second level compressor, freezing medium firstly receives pre-cooling of precooler; After passing through oil separator and dryer, it condensates on heat exchange coil. Condensed freezing medium passes through filter and capillary tube, then forms low temperature and low pressure liquid and evaporates in evaporator, in this way, refrigerator body temperature is cooled to -86 to -90℃.

To put it simply: first level compressor operates —— first level heat exchange coil cools—— second level compressor operates ——second level refrigerating system condenses in first level heat exchanger coil —— second level system reduces the temperature of refrigerator body(lower than -86 or -90)

2. Ultra-low temperature cabinet use

How to use:

After the first use of ultra-low temperature cabinets, or ultra-low temperature cabinet by handling or ultra-low temperature cabinet power (including power failure) more than 10

hours prior to use (or powered up again before use) inspection machine. Qualified to confirm the testing machine

The use of the cryogenic cabinet

1) Must stand for the freezer for at least 24 hours to energize.

2) empty containers not put items power on in stages so that the freezer before cooling to -40 ° C the normal open stop and then dropped to -60 degrees, normally open to stop eight hours and then transferred to -80 degrees, observed freezer there are normally open to stop more than 24 hours. Prove freezer performance is normal.

3) Press operation after 2 confirm the freezer normal freezers memory to place items. -60 ℃ items should be stored in principle, does not exceed 1/3 of tank capacity. Items stored in the temperature is higher than -60 ° C, freezer temperature should be set higher than the storage temperature 3 ° C (i.e., if the articles temperature is -20 ° C, then the cryogenic cabinet set at a temperature of -23 ° C), ensure the shutdown of the freezer, and a normally open stop more than eight hours.

4) prohibits: are all temperature freezer cold storage equipment, storage of low-temperature materials, can not be used to the higher temperature of quick-frozen plasma products, non-disposable put too many relatively too hot items, this will cause the compressor stop time machine, the temperature does not drop, it is easy to burn the compressor, resulting in damage to the machine box items. Items must be in batches into the points ladder temperature cooling, low temperature until needed!

5) If the user needs a way to in a short time the frozen equipment forming plasma products, now we specifically developed a frozen machine to meet user demand for frozen plasma.

3. Pressure switch and infusion of freezing medium

Pressure switch

Principle: when pipeline pressure at pressure switch exceeds 2.1MPa, contact disconnects, low temperature cabinet stops operation, pressure begins decreasing; when pressure

decreases to 1.35MPa, contact connects, low temperature cabinet starts up; when pressure exceeds 2.1MPa again, contact disconnects again, and it circulates in order.

Note: When pressure switch is being welded, put a wet towel on it to keep temperature below 100℃. The parameters of pressure switch cannot be adjusted.

Parameters: voltage 220V, 50Hz, contact capacity: 6A.

Freezing medium

Freezing medium is mixture, part of it is inflammable and explosive freezing medium, ventilation is required at infusion place. In case of leakage, avoid fire and spark near the place. When refrigerating system has a problem, it shall be judged by local after-sale service personnel, the problem shall be feed-backed. The technicians of Medical Application Business Department shall instruct local after-sale service personnel to repair it.

Infusion of freezing medium

When DW-86L386 series of ultra-low temperature cabinet products are repaired, there are very strict requirements for environment and repair, otherwise, refrigerating effect may be bad; to normalize the maintenance operation specification of medical application refrigerator DW-86L388 series of ultra-low temperature cabinet products, the following requirements shall be followed: Before the maintenance of system, at first, you should know the refrigerating principle of DW-86L388 series of ultra-low temperature cabinet products, the series of model is two-level refrigeration, which is divided into two independent systems of high temperature level and low temperature level; at the time of maintenance, the two systems shall not be opened at the same time, you must distinguish which system is failure, then open that system.

The humidity in maintenance shop shall not be too large, if it is cloudy or rainy, don’t open

the systems. For the machine that its system has already been opened, the pipe welding shall be finished at once.

As the machines have strict requirement for system moisture content, so, when a machines pipe is opened, the opening of pipe shall be sealed with tape at once to prevent air from entering in system, and pipe welding of opening shall be finished within 20 minutes.

As the system of DW-86L386 series of ultra-low temperature cabinet products has very strict requirement for vacuum degree, the system will occur bad refrigeration or non-refrigeration due to insufficient vacuum. Therefore, it is required that maintenance shop shall spend more time in vacuumizing this series of products than normal refrigerators; vacuum pump above two liters needs more than 6 hours, vacuum pump below two liters needs more than 8 hours. To ensure vacuum degree, when one system is being repaired, it is required that two vacuum pumps (high and low pressure) shall vacuumize separately at the same time, pressure gage and gage valve shall be installed on high and low pressure infusion tubes.

When evacuation time has been reached, firstly, stop high pressure evacuation, and the opening of high temperature infusion tube shall be sealed and welded immediately(as the pressure of freezing medium is too high, when a machine is refrigerating, high pressure can not seal the opening), low pressure evacuation shall continue for an hour. During this period, prepare freezing medium needed for infusion and relevant equipment. After one hour low pressure evacuation, turn off pressure gage valve; now, it is required that the machine shall keep the state of negative pressure for more than one hour to check if machine system is in vacuum state or not. During this period, check if pressure gage appears the condition of rising, otherwise, re-vacuumize for more than one hour, then keep the state of negative pressure for more than one hour, carry out such evacuation operation until pressure doesn’t rise, then infusion can be carried out.

4. Fan parameters

Product model / Parameter	SL-490C2W	
Special No.	/	/
Fan application	**Evaporation fan**	**Condensation fan**
Manufacturer	**EBM**	**EBM**
Fan model	**/**	**/**
Rated voltage	**230V**	**230V**
Input power	**10W**	**10W**
Fan type	**Induced draft type**	**Induced draft type**
Dimension	**Fan blade diameter 200**	**Fan blade diameter 230**

【Gas collection and charge】

1. Diagram of refrigerating machine

2. Compressor parameters

Product model		DW-86L386/288/388, DW-86W420	
Compressor model	**SC21CL**	Voltage range(V)	**208~230**
Refrigerating output(W)	**3/4 HP**	Rated frequency(Hz)	**50**
Input power(W)	**800W**	Current(A)	**3**
Rated voltage(V)	**220**	Cooling mode	**Forced wind cooling**
Product model		**DW-86L626/628/728/828**	
Compressor model	**GS26CLX**	Voltage range(V)	**220~240**
Refrigerating output(W)	**1 HP**	Rated frequency(Hz)	**50**
Input power(W)	**927W**	Current(A)	**4**
Rated voltage(V)	**220**	Cooling mode	**Forced wind cooling**

3. The characteristics of the refrigerant

1) Refrigerant mixed working quality, some flammable, explosive refrigerant perfusion spaces should be ventilated, once the leak, not in the vicinity of the ignition or sparking. Refrigeration system problems, feedback issues point by the local aftermarket judgment and guidance of the local after-sales maintenance, depending on the situation by the Medical Division technical staff.

2) Refrigerant code: high temperature level for R134a and R404a; Low Temperature the HRA (R290) and the HRB (R508b).

4. Refrigerant perfusion process

Preparatory work

1) refrigerant (R134A, R404A, HRA, HRB)

2) Hansen valve

3) standard electron (error ≤ ± 3g)

4) vacuum pump (≥ 4L)

5) The pressure gauge (requirements can be read at the same time a high-pressure, low pressure) is shown in Figure 1

Welded open system

1) The failure of the system from the end of the process tube, pipe clamp cut

open, and let go of the refrigerant in the system.

2) in the system, the opening 20 minutes, the open pipe with a pressure gauge welding is completed

【Note】

1) This model is a two refrigeration, sub-high temperature and low temperature level, two separate sets of system maintenance, do not avoid two systems at the same time to open, must understand that the open set of system

2) the maintenance shop humidity can not be too large, in case of cloudy rainy weather, prohibiting the opening of the system, should immediately open system machine pipe welding completed

3) because of the machine on the water in the system is very strict, so the machine pipe openings should immediately tape each pipe junction sealed to prevent air from entering the system, and requires the completion of 20 minutes each opening pipeline welding

Vacuum

1) the middle of the vacuum pump connector with a pressure gauge common connector, as shown in Figure 2

2) Turn on the vacuum pump, vacuum degree ≤ 3Pa taking the time to time refer to the attached Note. See Figure 3

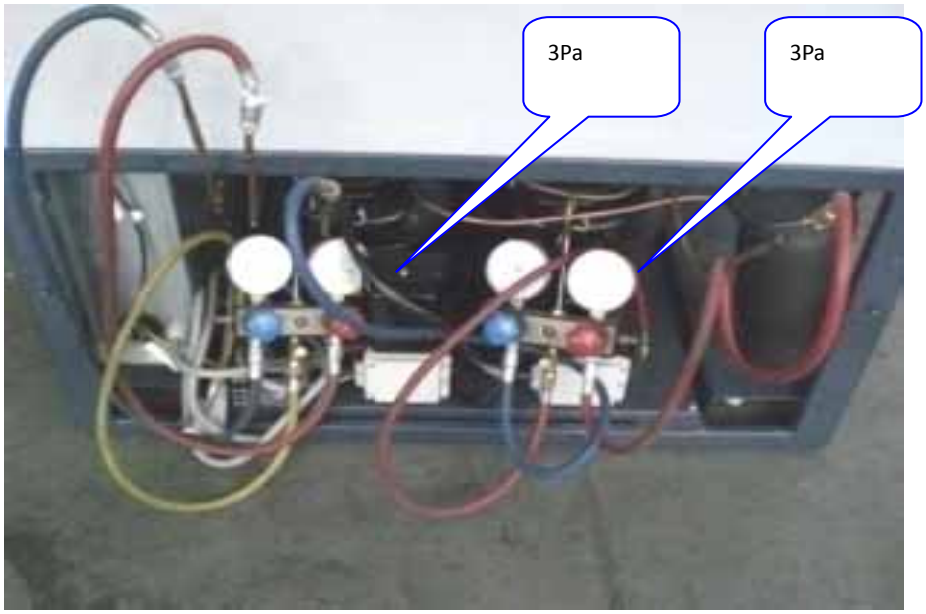
3) When the requirements of the degree of vacuum is reached, the first stop

high pressure the time and quickly high temperature perfusion tube welding sealing machine refrigeration high pressure (refrigerant pressure is too high, can not seal the mouth), low pressure continues to find time to one hour. See Figure 4

4) low pressure for taking the time to one hour after the close the pressure gauge valve, pressure gauge is then maintained at a negative pressure for one hour or more to check the machine system is in a vacuum state, observed in this period requires that the machine picked up the case, otherwise re-taking the time to more than one hour, and then continue to remain in the negative pressure state for more than one hour, so evacuated operation until such time as the pressure does not rise so far before reperfusion.

【Note】

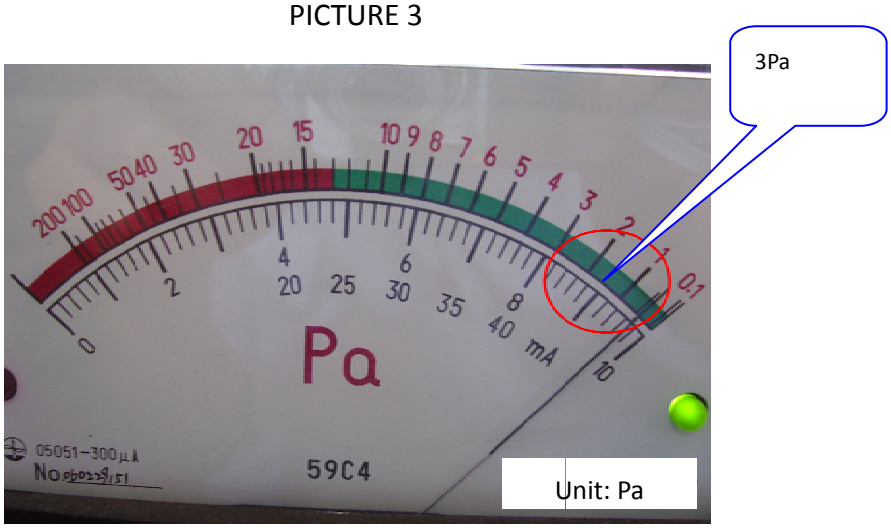
1) Using 4 liters or more of the vacuum pump is necessary for taking the time to 12 hours



PICTURE 1

PICTURE 2

PICTURE 3



PICTURE 4

Perfusion refrigerant

high temperature level perfusion, the machine should be in a stopped state before perfusion R134A refrigerant and then perfusion R404A refrigerant. Perfusion was performed in accordance with the attached table!

【Note】

1) To ensure the refrigerant once reperfusion in place, the above refrigerant is required when the cylinder is inverted perfusion liquid perfusion in Figure 5

2) Low-level refrigerant reperfusion, the same machine should be in a stopped state, first perfusion HRA refrigerant, then perfusion HRB refrigerant, because of higher the HRB refrigerant pressure. Perfusion was performed in accordance with the attached table!

Irrigation after the infusion process tube sealing, sealing effect is shown in Figure 6

【Note】

1) Low Temperature perfusion must be accurate, small differences will affect the cooling effect

2) low temperature and high pressure refrigerant, refrigerant cylinder is relatively small, perfusion, to open the cylinder valve slowly to avoid the waste of refrigerant.

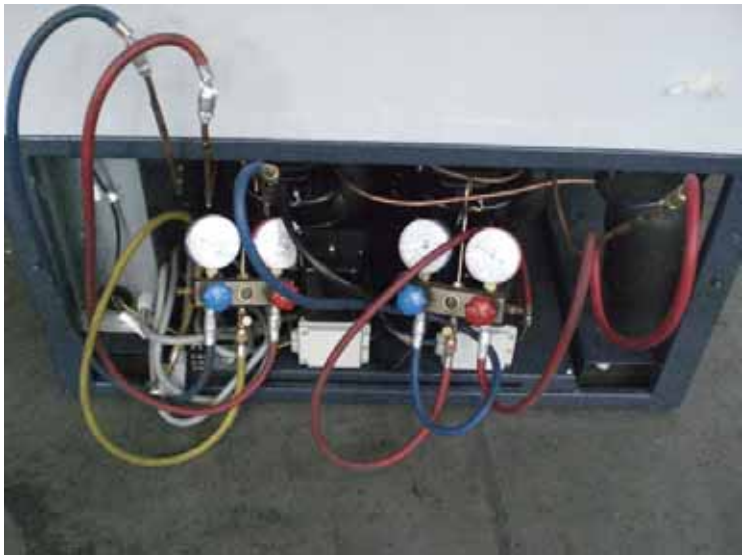
3) HRB refrigerant pressure is too high, the general cylinders can not withstand the high pressure, so the use of oxygen bottles filled irrigation HRB refrigerant cylinder below the export blocked with screws to prevent the leakage of

refrigerant necessary, using the above export perfusion, the above infusion refrigerant cylinders upright perfusion, the perfusion gas.

4) In order to ensure the accuracy of refrigerant perfusion, perfusion of all refrigerant necessary electronic weighing scales perfusion.

5) Evacuation and refrigerant perfusion is not in accordance with the above requirements and operating process execution lead to machines refrigeration poor or no refrigeration, and returned machine outlets.

6) The number of ultra-low temperature cabinet products perfusion refrigerant accuracy (g) is very strict, said in 3g standard electronic network maintenance must be prepared before an error.



PICTURE 5

PICTURE 6

5. Infusion flow of freezing medium

①The schematic diagram of each freezing medium cylinder

②Infusion flow of freezing medium

When infusing high temperature level freezing medium, machine shall be under the status of stop, firstly, infuse R134Afreezing medium, then infuse R404Afreezing medium; to ensure that freezing medium can be infused successfully at one time, at the time of infusing above freezing mediums, cylinders must be placed upside down to infuse liquid.

As the infusion quantity of low temperature level freezing medium is small, and the requirement for the infusion quantity of freezing medium is very strict, if infusion quantity is not accurate, refrigerating effect will be directly affected. As low temperature freezing medium has high pressure, freezing medium in cylinder is small, so you are required to prepare everything in advance when you are going to infuse low temperature level freezing

medium, at the time of infusion, you must turn on cylinder valve a little to avoid wasting freezing medium and affecting maintenance progress.

When infusing low temperature level freezing medium, machine shall also be under the status of stop, firstly, infuse HRA freezing medium, then infuse HRB freezing medium; as HRB freezing medium has very high pressure, ordinary cylinders cannot bear very high pressure, so oxygen cylinders are used to contain HRB freezing medium; at the time of using, the exit at the bottom of cylinder must be plugged up with a screw to prevent freezing medium from leaking. The top opening can be used for infusion; when infusing above freezing mediums, cylinders can be infused with gas vertically.

To ensure the accuracy of freezing medium infusion, at the time of infusing all freezing mediums, an electronic scale shall be used to weigh the infusion.

If the evacuation time of machine system freezing medium infusion are not carried out according to above time requirement and operation flow, as a result, a machine has bad refrigeration or no refrigeration, and the machine is replaced or returned, once verified by our head office, those that are re-maintained shall be claimed according to two times of the machine's maintenance cost, in case that machine is replaced or returned, the maintenance shop shall pay for the cost.

As the system of DW-86L388 series of ultra-low temperature cabinet products has very strict requirement for the infusion quantity accuracy (gram) of freezing medium, maintenance shops must prepare a standard electronic scale within the error of 3 grams before maintenance, as the freezing medium of ultra-low temperature machine is made up of concentrated freezing medium mixtures, the infusion quantity marked on the back of machine is only used for reference, it is not actual infusion quantity, before infusing freezing medium, maintenance personnel must contact the Head Office, which will provide maintenance guidance.

【Refrigerant perfusion Details】

Type	High-temperature stage		Low-temperature stage			
	The refrigerant (type / amount) 1		The refrigerant (type / amount) 2			Improved date
	R134A（g）	R404A（g）	R508B（g）	R290（g）	R23（g）	
DW-86W100	/	510	140	20	/	
DW-86W420	/	540	160	20	/	
DW-86L288/286	/	540	210	20	/	
DW-86L338	/	560	200	20	/	
DW-86L386	/	570	235	20	/	
DW-86L388	/	560	235	20	/	
DW-86L486	/	580	265	30	/	
DW-86L490	/	550	285	30	/	
DW-86L626/628	90	810	305	30	/	
DW-86L728	90	800	320	30	/	
DW-86L828	80	685	315	30	/	
DW-86W420 (old type)	180	420	/	20	140	2012.4.1
DW-86L288 (old type)	165	385	/	24	135	2011.1.10
DW-86L386 (old type)	95	525	/	28	162	2010.11.24
DW-86L388 (old type)	95	525	/	28	162	2011.1.12
DW-86L626/628 (old type)	180	420	/	30	180	2010.12.25

[Note] refrigerant type and weight of the nameplate subject shall not be mixed or misuse of refrigerant.

【Troubleshooting】

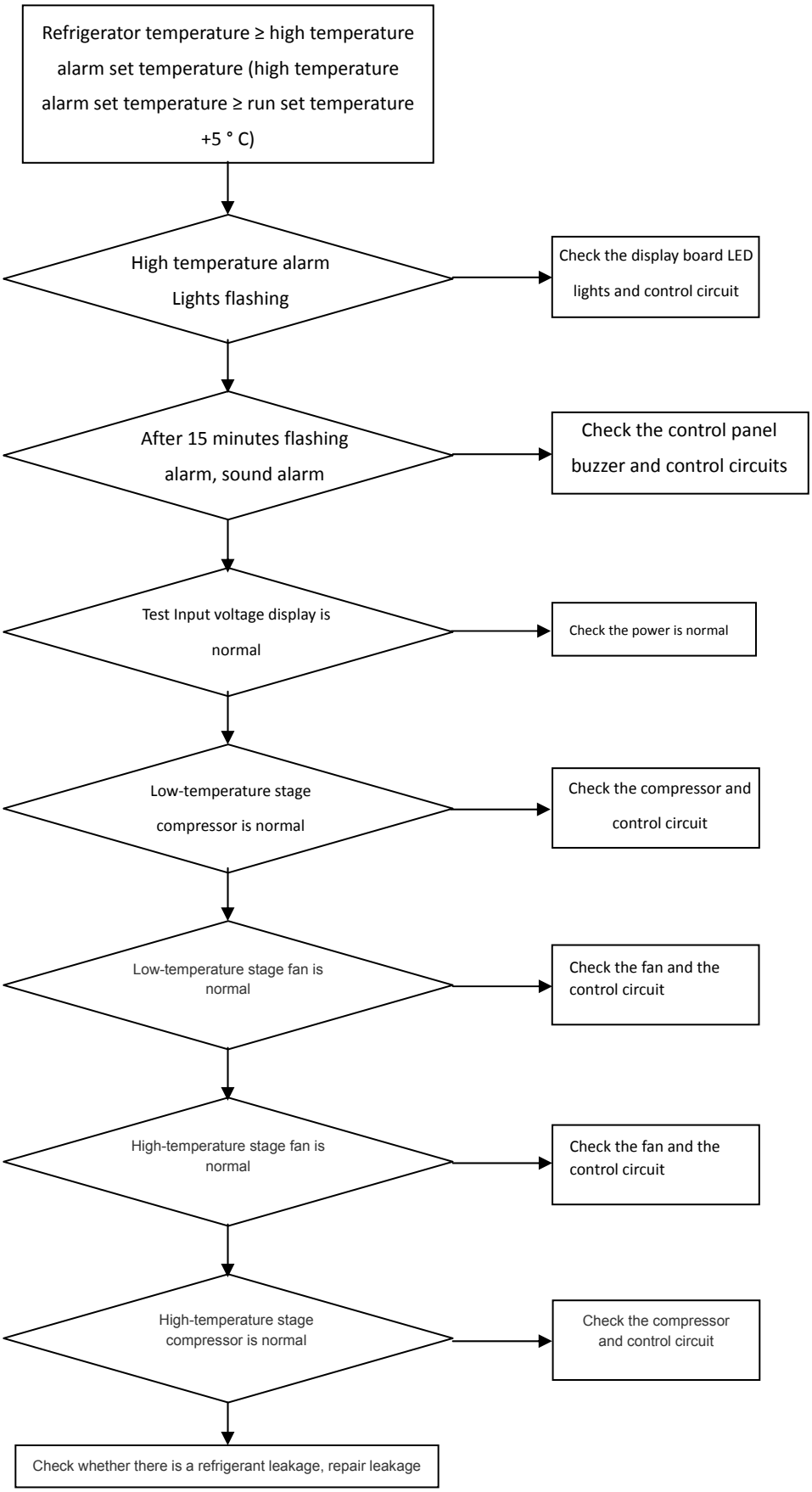
Fault	Analysis	Maintenance Measures
1.High temperature level compressor fails to start	1. User's fuse burns out	Change the fuse
	2. Machine storehouse wiring connector plugs s are damaged	Change the connector plugs
	3. Bas wire contact	Check contact and make in good condition.
	4. Display panel and control panel connection failure	Checking if it is due to bad connection, otherwise, change it.
	5. Relay, start capacitor or heat protector is damaged	Change the part.
	6. Compressor fault	Change the compressor
	7. User's voltage is too low	Add a manostat
2.Low temperature level compressor fails to start	1. Same reason as high temperature level compressor	Same measure as high temperature level compressor
	2. Pressure switch is damaged	Change the pressure switch
	3. High temperature level compressor has poor refrigeration	Repair high temperature level refrigerating system
3.Fan does not rotate	1. Fan wiring is loose	Checking the wiring
	2. Fan blades are blocked by foreign matters	Checking and clean them
	3. Fan is damaged	Change parts
4.High temperature in cabinet	1. The temperature setting of outage is too high.	Re-set computer board
	2. Refrigerant leaks.	Find leak location and make repair welding. Infuse refrigerant again.
	3.Temperature probe is damaged	Change parts
	4. Capillary tube or system is blocked by dirt\ greasy	Clean the capillary tube or change filter.
	5. High ambient temperature	Turn on air-conditioner，reduce ambient temperature.
	6. Condenser blockage	Clean condenser
5.Display board displays E0 E1 E2	1. Temperature probe short circuit or disconnect	Checking the temperature probe
	2.No temperature probe	Install a temperature probe

Fault	Analysis		Maintenance Measures
6.Freezing cabinet noise is high	1. Uneven placement		Change the location of the freezing cabinet.
	2. When compressor is running, there is resonance between pipeline and cabinet.		Clear up pipeline，or add a shock pad under compressor baseboard To avoid resonance.
	3. Interior fan and fan holder are fixed tightly		Fix them
	4. Compressor connecting bolts are loose.		Screw the connecting bolts tightly.
7.Ultra-low-temperature freezing cabinet does not refrigerate	High temperature level compressor vent-pipe is not hot	High/low temperature level pipe leaks	Find the leak location and make repair welding
		Compressor is damaged	Change the compressor
	Low temperature level compressor vent-pipe is not hot	Low temperature level pipe leaks	Find the leak location and make repair welding
		Compressor is damaged	Change the compressor
	High and low temperature level compressor vent-pipes not hot.	High/low temperature level pipe leaks	Find the leak location and make repair welding
		Compressor is damaged	Change the compressor
	Low temperature level compressor protection	High temperature level pipe leaks	Find the leak location and r make repair welding
		Low temperature level refrigerant is infused too much	Reduce infusion
	Compressor does not' start	Same analysis as the non-start of high/low temperature level compressor	Same repair measure as the non-start of high/low temperature level compressor

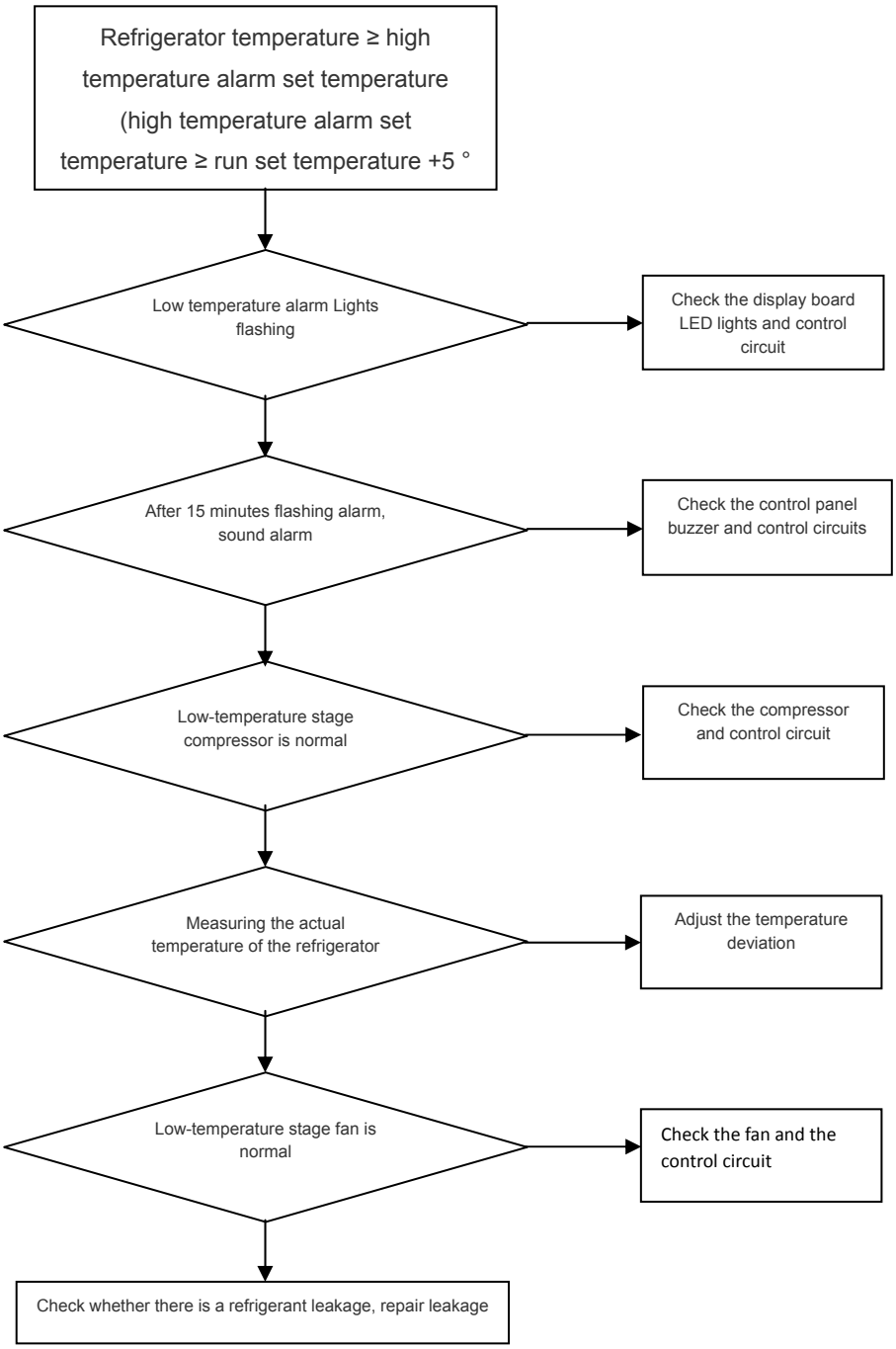
Fault	Analysis	Maintenance Measures
8. Displayed temperature is different from actually tested temperature	1. The user's test instrument is not accurate	Change the test instrument
	2. Temperature probe of sensor is not accurate	under locked state，press down "temperature" button until temperature calibration value displays flickeringly on the displaying area of setting temperature, now you can set a new temperature calibration value.
	3. Displayed temperature is the temperature at the temperature-control probe, it is normal that there is certain temperature difference between upper part and lower part in refrigerator.	
9 Temperature difference between upper part and lower part in refrigerator is too large	If a user opens and closes the door frequently，it is normal that temperature inside the box is unstable, it is not fault.	Reduce the times of opening and closing the door.
	It is normal that there is temperature difference between upper part and lower part in low temperature cabinet.	
10. it Displays that inside temperature sometimes is high and sometimes is low(Sometimes more than 20 °, sometimes below zero)	Computer board has a failure，refrigerating system can not work normally.	Change the Computer board
11. Display E0 or other signs.	Master sensor fault: E2，condenser- sensor fault: E1，ambient temperature sensor fault: E0	Check if sensor contact is bad or not，otherwise, change the sensor.
12. The start of high temperature level compressor is normal，but Low temperature level compressor protection is not normal, does not start and fails to refrigerate.	High temperature level refrigerant leaks	Maintenance high temperature level compressor.
13 Temperature can only be maintained at about 50° for a long time, and temperature neither rises nor falls, and the machine is operating normally.	Low temperature level refrigerant leaks	Infuse refrigerant
	Refrigeration pipe line is blocked	After shutdown, open the cover to balance inside and outside temperature， then start up again.
		Infuse refrigerant again，and change the filter.
14. It displays that voltage is high or low	Displayed voltage is the voltage at the user's socket，it is normal.	/

1.E0 alarm	Ring temperature sensor input voltage ≥ 4.9V, the sensor open; ≤ 0.1V, the short-circuit	1.Check the ambient temperature sensor terminal plug bad or falling; sensor for damage
		2 Check the display board sensor connector terminals are loose or poor contact; whether the display panel damage
2.E1 alarm	When the condenser sensor input voltage ≥ 4.9V, the sensor open; ≤ 0.1V, the short-circuit	1.Check the ambient temperature sensor terminal plug bad or falling; sensor for damage
		2 Check the display board sensor connector terminals are loose or poor contact; whether the display panel damage
3.E2 alarm	Main sensor input voltage ≥ 4.9V, the sensor open; ≤ 0.1V, the short-circuit	1.Check the main sensor terminal plug bad or falling; sensor for damage
		2 Check the main control board sensor plug terminal is loose or poor contact; master plate for damage
4.E3 alarm	Heat exchanger sensor input voltage ≥ 4.9V, the sensor open; ≤ 0.1V, the short-circuit	1.Check the heat exchanger sensor terminal plug bad or falling; sensor for damage
		2 Check the main control board sensor plug terminal is loose or poor contact; whether the display panel damage
		3. Replacement spare sensor
		4. "E3", long press to "beep cancel" after 5 seconds, "E3" alarm will disappear when the alarm. The temperature stage one minute after the start of the Low Temperature startup
5. The condenser dirty, alarm	Condenser probe perception of condenser temperature minus the difference in ambient temperature ≥ 13 ° C (for five minutes), alarm occurred	1.Open the front grille and clean the filter
		2.Check whether the condenser probe away from the condenser outlet too close
		3.The condenser probe take Changuo processing tape
6. Battery low alarm	≤ 10.5V battery power, battery low alarm	1.Investigation and whether the battery have expired
		2 the troubleshoot battery switch on terminal block whether the patch well or switch is damaged
		3.Investigation and charging circuit is normal: strong power after five minutes on the refrigerator, the test master board battery terminal voltage output, the output voltage should be ≤ 5V

【How to deal with High temperature alarm】


Refrigerator temperature ≥ high temperature alarm set temperature (high temperature alarm set temperature ≥ run set temperature +5 ° C)
High temperature alarm Lights flashing
Check the display board LED lights and control circuit
After 15 minutes flashing alarm, sound alarm
Check the control panel buzzer and control circuits
Test Input voltage display is normal
Check the power is normal
Low-temperature stage compressor is normal
Check the compressor and control circuit
Low-temperature stage fan is normal
Check the fan and the control circuit
High-temperature stage fan is normal
Check the fan and the control circuit
High-temperature stage compressor is normal
Check the compressor and control circuit
Check whether there is a refrigerant leakage, repair leakage

【How to deal with Low temperature alarm】


Refrigerator temperature ≥ high temperature alarm set temperature (high temperature alarm set temperature ≥ run set temperature +5 °
Low temperature alarm Lights flashing
Check the display board LED lights and control circuit
After 15 minutes flashing alarm, sound alarm
Check the control panel buzzer and control circuits
Low-temperature stage compressor is normal
Check the compressor and control circuit
Measuring the actual temperature of the refrigerator
Adjust the temperature deviation
Low-temperature stage fan is normal
Check the fan and the control circuit
Check whether there is a refrigerant leakage, repair leakage

【Points needing to pay attention】

1. Points needing attention during normal use-proper use

●When the refrigerator is firstly used or the storage box hasn't been used for a long time, the alarm "Low battery" will appear, because the charged battery has been completely discharged. But it doesn't mean that there is a fault. In this case, the empty battery will be charged adequately, to make the storage box to continuously run for about 6 days.

●When the storage box runs, areas around the door frame of the outside case of the refrigerator body will be heated and it isn't a fault. This is because a dew removable tube is installed around the refrigerator door in order to avoid the condensation around the refrigerator body.

●Before the articles are put into the storage box, firstly the temperature inside the refrigerator must be confirmed to have adequately dropped, then put the articles into it in batches, to avoid temperature rise.

●Temperature display value of ultralow storage box is to display the temperature of heat detector of the storage room. Although there is a difference between the displayed temperature and the actual temperature in the center of storage room, it will approach to the true temperature gradually.

●A through hole is provided on the backwall board of the storage box, so as to lead out the measurement wire from the refrigerator during testing. After the measurement wire is led out, the testing hole must be blocked well again with heat insulating material, otherwise the temperature inside the storage room won't drop completely, and condensation will be caused around outside the through hole.

●The equipment shall be cleaned with the diluted neutral cleanser (the cleanser undiluted will damage the plastic components. Refer to Instructions for Cleanser for the dilution method). The storage box shall not be cleansed with brush, acid, gasoline, soap power, polishing power or hot water, because they will damage the painting surface or the plastic or rubber parts. It must be specially note that the plastic or rubber parts shall not be wiped with the volatile solvent such as gasoline.

●After the storage box has run for a period, a layer of frost will be formed on the inner wall and

inner door of the refrigerator body. If it is too thick, freezing effect of the storage box will be influenced, to increase the power consumption. Therefore, when the frost layer reaches 5mm thick, it shall be removed with the shovel attached at intervals.

●Prior to defrosting, please take out the articles from the box and put them into another one for freezing, to avoid damaging the articles due to temperature rise inside the storage box.

●There are many cooling coils on the back of inner wall and the side, don't remove the frost on inner wall with knife, ice chisel or screwdriver. During defrosting, the inner wall shall not be scratched; otherwise it will produce the equipment fault.

●When the storage box hasn't been used for a long time, the power shall be shut off and the battery switch shall be switched off at the same time.

2. Points needing attention during normal use-safety requirement

Please apply the special power (AC220V-/50Hz) marked on the equipment nameplate. If the voltage applied is less than 198V or higher than 242V, the automatic stabilizer exceeding 4000W shall be provided. If the power wire needs to be lengthened, section and length of the lengthened part shall not be less than 2mm2 and greater than 3m respectively. Application of the power with other voltage or frequency which isn't marked on the nameplate will possibly cause fire or electric shock.

Power wire of the storage box is equipped with 3-wire (earthing) plug, meeting 16A standard 3-wire (earthing) socket. Under no circumstances, earthing pins of the power wire shall not be cut off or removed. Plug and socket of the power wire must be guaranteed to be connected securely, otherwise it will produce fire.

The power socket with earth wire shall be used, to avoid electric shock. If the power socket isn't earthed, then the earth wire shall be installed by the qualified engineering technician.

The equipment shall not be earthed via gas pipe, water supply pipe, telephone line or arrestor. Because the above earthing will produce electric shock or other dangers.

This equipment shall not be used in open air. When the storage box suffers rain, the accidents such as current leakage or electric shock will possibly produced.

The equipment only can be installed by the qualified technician or maintenance personnel. Otherwise electric shock or fire will be caused.

The equipment must be placed on the solid ground. If the ground is unstable or placement location is improper, the equipment will turnover or be damaged.

The equipment shall not be placed at the moist place or easily suffering from sprayed water. Otherwise the accidents such as current leakage or electric shock will be caused due to reduction of insulation degree.

The inflammable and explosive dangerous articles or the volatile articles shall not be stored in the equipment, or the inflammable spray shall not be used nearby it, otherwise it will cause

explosion or fire.

The corrosive articles such as acid and alkali shall not be stored in the equipment; otherwise its inner components or electric parts will be damaged.

The metal object such as iron nail or iron wire shall not be inserted into any port or clearance of this equipment, or any exhaust port for inner air circulation, otherwise the electric shock or damage will be produced due to the contact between above object and running part.

When the equipment is used to store the poison, harmful or radioactive articles, it shall be used in the safe area. Otherwise it will cause personal injury or environmental harm due to improper use.

When the inflammable gas such as gas leaks, the leakage valve shall be shut off. Then open the doors and windows for ventilation and exhaust. Don't pull out or insert the power plug of the storage box.

The equipment power shall be disconnected prior to its any repair or maintenance, to avoid electric shock or personal injury.

During maintenance, the chemicals or suspended particles inside the equipment and it's around shall not be absorbed, otherwise the health hazard will be caused.

When the plug is pulled out from the power socket, the plug shall be tightly held, and its lead shall not be pulled. If it is pulled with hand, the electric shock or fire disaster due to short circuit will possibly produced.

Any electrical parts or switch such as power plug shall not be touched with wet hands; otherwise the electric shock will be produced.

When the equipment is restarted after power failure or the power is shut off, its settings shall be checked. Change of settings may damage the articles stored.

Don't put the vessels with water or heavy object on the equipment. If the articles fall, personal injury may be caused, and the water from it will produce current leakage or electric shock due to reduction of insulation degree.

Don't climb up the equipment or put articles on the equipment, otherwise personal injury or

equipment damage will be caused due to equipment turnover.

Close the box door with your hand holding the handle, to avoid the fingers being clamped.

Don’t put the glass bottle or canned goods into the box, since personal injury will be caused due to their frost cracking.

Don’t touch the goods stored. Direct touch of the freezing articles or inner wall of the equipment may produce cold injury.

The gloves shall be worn during repair, to avoid damaging the hands by the sharp edge or corner.

The filter net shall ne check immediately, and cleaned if necessary. The filter net with accumulated dust will lead to temperature rise or fault.

When the equipment hasn’t been used for a long time, the power plug shall be pulled out, to avoid electric shock, current leakage or fire due to ageing of power wire.

The plastic bags shall not be approached by the children, because it will possibly produce suffocation accident.

When Co2 is used to cool the system as an auxiliary mode, air ventilation in the room shall be noted. Rise of Co2 concentration in the air will harm the health and endanger the life safety.

When moving the storage box, its inclination angle shall not exceed 45 degree.

Don’t pour the water on the equipment directly, otherwise the electric shock or short circuit will be caused.

The user shall not dismantle, repair or change the equipment by him. If the above operations are done by the unauthorized personnel, fire disaster or personal injury may be caused because of improper operation.

If the equipment is placed at the unattended area for a long time, please ensure that the children won’t approach it and the box door can’t be closed fully.

Once the storage box is disconnected from the power, it shall be connected again five minutes

later, so as not to damage the compressor or system. The power plug must be pulled out during maintenance. Don’t roll or damage the power wire.

Disposal of the discarded equipment must be carried out by the relative personnel. The box door shall be dismantled, to avoid the accidents such as suffocation.

3. Points needing attention during normal use-disposal of special circumstances

If the equipment has any fault, please check the following faulty points before maintenance:

The equipment can't be started

●Check the power is normally connected or the mains switch is switched on or not?

●Is the voltage is too low?

●Is there too much articles stored in the storage box one time?

Bad cooling

●Is the ambient temperature too high?

●The inside and the outside door are opened tightly? (Frost between the box body and the door seal will damage the sealing of door).

●Is the filter net of the condenser blocked by dirt?

●Is the temperature setting is correct?

●Is the storage box far away the direct sunshine?

●Is the storage box close to heat source?

●Are the rubber cover and heat insulating material used by the testing through hole placed correctly?

●Is there too much unfrozen articles placed in the storage box within several hours? (Under this case, it is a temporary problem. The setting temperature can be adjusted to high, making the storage box normally start and shutdown within a short time, so as to reduce the setting temperature gradually).

●Is the storage box installed on the solid ground?

●Does the casing of storage box touch any object?

●Is the storage box supported with horizontal supports?

●Is the storage box in low temperature running status?

●There is noise with the storage box when it is in high temperature due to too much load. This noise will become smaller and smaller with temperature reduction of the storage room.

●Please check whether the noise is from the compressor (noise of the ultralow equipment's compressor is bigger than the household products).

●Tapping: It may be caused by the urgent cooling and shrinkage of the parts inside the equipment;

hence the equipment temperature shall be reduced by steps, to avoid too much temperature reduction within a short time.

【Warning】

In order to prevent electric shock or personal injury, the equipment shall be disconnected from the power prior to any repair or maintenance.

Ensure that the chemicals or suspended particles around the equipment shall not be absorbed during maintenance; otherwise it will endanger your health.

【Other maintenance and repair】

1. Clean storage box

Storage box shall be cleaned once a month. Regular cleaning can make storage box keep clean appearance.

Use a dry cloth to wipe off dirt on box shell, inner chamber, and all attached bodies. If storage box is very dirty, dip a clean cloth into neutral detergent and remove dirt, and then use a wet cloth to remove residual detergent; at last, use a dry cloth to wipe dry. (Undiluted detergent may damage plastic parts, please refer to the instructions for diluting detergent.

Don’t pour water on storage box shell or in storage chamber, otherwise, electrical insulation may be damaged, which may cause failure.

Compressor and other mechanical parts are under totally-seal state, they need not to be lubricated.

Frost or ice on inner wall shall be removed once a month; condenser filter screen shall also be cleaned once a month.

2. Clean condenser filter screen

When “condenser is dirty” alarm lamp on storage box display panel is flashing, filter screen needs to be cleaned. Even the lamp is not flashing; filter screen shall be cleaned once a month.

If filter screen is blocked, the service life of compressor will be shortened, temperature reduction will also be slowed down, please clean filter screen according to following steps:

Pull machine storage front shield out.

Take out filter screen.

3. Clean filter screen with water.

Put filter screen back to original place and install machine storage front shield.

If “condenser is dirty” alarm lamp is flashing before the cleaning of filter screen, please check if the lamp is OFF after the cleaning.

4. Defrost inner wall

Generally, frost occurs on the upper part of refrigerator body and inner door. Frost may cause gap between refrigerator body and door sealing strip, which may cause bad refrigerating effect. Defrost on inner door with a defrosting shovel, which is provided together with the equipment. Empty refrigerator body, and then defrost according to the following method:

Note: Don't defrost with the tools that have sharp edge and corner, for example, a knife or a screw driver.

1. Take out objects in refrigerator and put them into another storage box, or a container with freezing liquid-state carbon dioxide.
2. If there is an aided cooling device, turn off the device.
3. Turn off the power.
4. Open outer door and inner door, let refrigerator outer door naturally open for a period of time to melt frost.
5. Use a dry cloth to wipe off the water on refrigerator bottom.
6. After finishing cleaning refrigerator body and inner door, restart the equipment.
7. Put the objects back into already fully-cooled refrigerator body.
8. If there is an aided cooling device, turn on the device.

5. Battery maintenance

When low-temperature storage box is continuously working, please check the electricity quantity of battery. When you find the electricity quantity of battery is low, please ensure that battery switch is ON, at this time, the battery is recharged. When the battery has been recharged continuously for a week, please test the electricity quantity of battery again; under normal condition, at this time, the electricity quantity of battery should be full. If the condition of insufficient electricity quantity of battery still appears, please replace the rechargeable battery.

Power-off alarm battery is a consumable. The life service of battery is about 3 years. If battery is used more than 3 years, it may not fail to act at the time of alarming, and the setting of

storage may be affected. It is suggested that the battery shall be replaced as soon as possible. If you need to replace battery, please contact Haier after-sale service personnel.

Warning:

To avoid electric shock or personal injury, before equipment maintenance or repair, the power must be cut off.

When maintaining the equipment, make sure not to breathe in drugs or suspended particulates around the equipment, which may be harmful to your health.

【FAQ】

1. Common Faults Analysis and Maintenance Measures

①**Question:** Displayed temperature is not the same as actual test temperature:

Answer: As the displayed temperature is the temperature at one point in refrigerator, while a user is testing the temperature of another point in refrigerator, as position is different, temperature must be different, meanwhile, the user's testing tool may have certain measurement error with our temperature detector.

②**Question:** The temperature difference between upper part and lower part in refrigerator is too large:

Answer: As our machines start refrigerating from up to down, the upper part temperature is lower than lower part, meanwhile, the temperature difference is large. The temperature difference of like products in the world is 5~8 ℃, basically, our temperature difference is maintained around the temperature. In addition, if a user open and close refrigerator doors frequently, big temperature difference between upper part and lower part may appear.

③**Question:** What is voltage-increase start?

Answer: To ensure the normal operation of machine, our machines have the functions of increasing and decreasing voltage. When a user's voltage is lower than 183 V, the machine is unable to start, at that time, the user needs to check if his line is normal or not;

④**Question:** A user has set -86℃, why it rises up to -82℃?

Answer: To ensure the service life of machine, our products are designed as the followings: when ambient temperature is higher than 32℃, if setting temperature is lower than -82℃, it will return to -82℃, if ambient temperature is lower than 32℃(including 32℃), it will return to original setting;

⑤**Question:** Why is it displaying E0 and other signs?

Answer: Main sensor failure: E2，condenser sensor failure:E1, ambient temperature sensor failure:E0, check if above wiring is normal or not, if is not normal, please contact after-sale service personnel for maintenance or replacement.

⑥**Question:** If the machine is moving when I open its doors, what shall I do?

Answer: Our machines have casters, which are flexible, moveable, lockable, and supportable, and can be slightly adjusted according to request. After a machine is installed on the position appointed by a user, the two front casters shall be fixed to prevent the machine from moving when its doors are opened.

⑦**Question:** Why the door of low temperature cabinet can not be opened?

Answer: there are two cases:

First case: There is a balance hole at the bottom of door body, if it is blocked by ice, the stuffiness may cause internal pressure to be too low, and so the door can not be opened. There is also a possibility that balance heater strip is broken, so a new part needs to be replaced for you. Disposal method: Squeeze in a thin iron sheet between door sealing strip and door body to let air enter into refrigerator.

Second case: When a user is storing an object containing water, if water flows to sealing strips and freezes, the door is unable to be opened.

Disposal method: open the door with a tool.

2. Alarm of battery low electric quantity:

There is a standby battery in every machine, when there is power failure or a machine is breaking down, the battery will supply power to display panel, through the temperature displayed on display panel, users can see the change of temperature inside machine.

Disposal method:

Check if battery switch is open or not, if battery wiring and switch wiring are plugged or connected in position, if battery electric quantity is over 10.5 V(for old products with mode of

6, it shall be over 7.5V)， so model machine computer panel can recharge battery; if battery electric quantity is lower than 10.5(for old products with mode of 6, when it is lower than 7.5V), a machine starts to recharge the battery, it takes about 5 days to finish recharging battery; if the machine still meets the problem of battery alarm, the battery needs to be replaced. When the machine is not used, battery switch must be turned off, otherwise, after battery electrical quantity is exhausted, the battery cannot be recharged, which will cause the battery to be scrapped;

3. Alarm of dirty condenser:

There are three kinds of cases that may cause the alarm,

First, new machine: as there is a sensor on condenser, when condensing temperature exceeds 38℃(exceed 32℃ in earlier stage), at this time, dirty condenser alarm may occur; When a user just starts a machine, as the temperature inside refrigerator is high, cooling load is large, heat release is also large, at this time, condenser temperature is too high, the signal sent by sensor to computer panel thinks that the condenser is dirty, so alarm occurs; after the machine has operated for a period of time, the alarm will disappear automatically.

Deposal method: communicate with users and explain the cause of alarm and machine features.

Second, ambient temperature is too high, so the condensing temperature of machine is correspondingly too high, and exceeds 38℃, at this time, the machine will also occur the phenomenon of dirty condenser alarm;

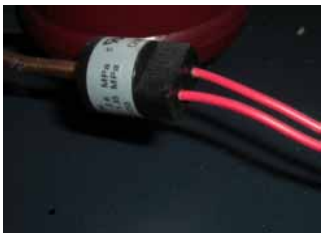
Deposal method: reduce the machine's ambient temperature.

Third, the machine has been used for a long time, or user environment is quite dirty, there is too much dirt on condenser filter screen, the heat dissipation of condenser is poor, at this time, the machine will sound the dirty condenser alarm.

Deposal method: clean off the dirt on condenser filter screen.

【Used Spare Parts Photo Gallery】

DW-86L628

Sn	Part code	Spares Name	qty	picture	Whether wearing parts
1	0070701061	Filter dryer	1		
2	0070700606	pressure control switch for 2nd stage	1		
3	0070701865	Suction accumulator	1		
4	0270200538	Outer gasket for outer door	1		Y
5	0270200322B	Inner gasket for outer door	1		Y
6	0074091319	control board	1		Y

7	0070101872	duplex all-round caster	1		
8	0074091318	Display board	1		Y
9	0074091225	Condenser temperature sensor	1		
10	0074090884	Ambient sensor	1		Y
11	0070204295	Cover for access port	1		
12	0070204827	Inner door handle	1		Y
13	/	Defrost shovel	1		

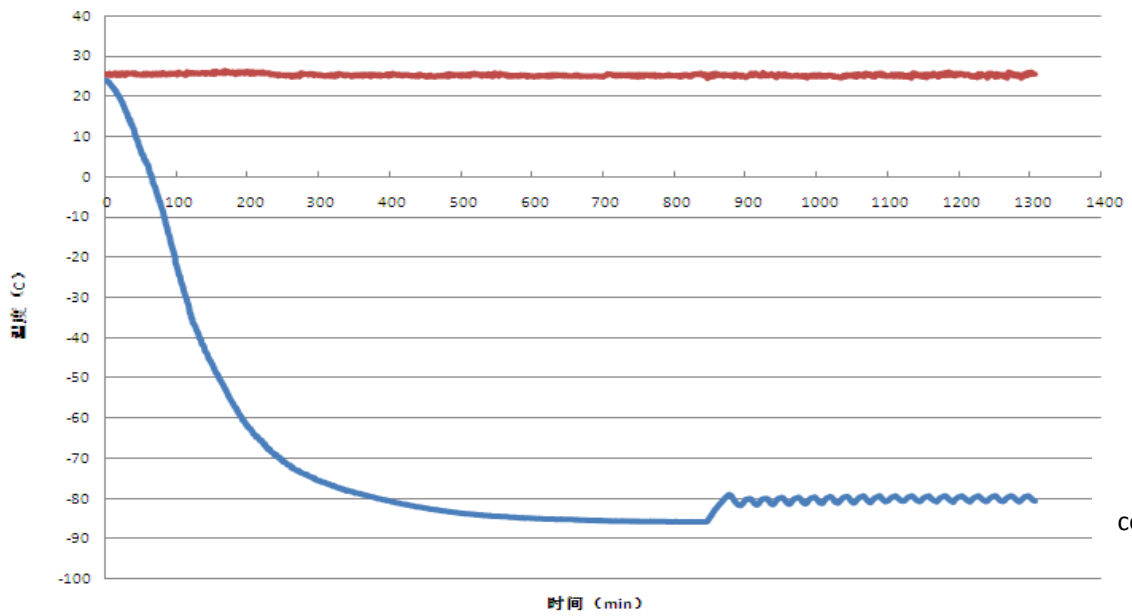
14	0270800385	Outer gasket for inner door (Interior door assembly)	1		Y
16	0270800385	Inner gasket for inner door (Interior door assembly)	1		Y
17	0070401235	Battery power switch	1		Y
18	0070106373	Inner door hinge	1		Y
19	0070107087	Outer door hinge	2		Y
20	0070107112	Outer door handle	1		
21	0074091430A	Rechargeable battery of 12VDC	1		

22	0070700552	Oil separator	1		
23	0074091183	Cabinet temperature control sensor PT100	4		
24	0270700027	Air cooled condenser	1		
25	/	Door switch for backup system control	1		Y
26	0074090871	AC contactor (220V/60Hz)	1		Y
27	0074090857	Fan for low stage (220V/60Hz)	2		Y
28	0074090857	Fan for high stage (220V/60Hz) 17&22&25&28	1		Y
29	0074091167	compressor(220V/50Hz) （danfoss）	1		Y

30	0024000070	Power relay for compressor(220V/60Hz)	1		Y
31	0070815591	Catch assembly for latch mechanism	1		Y
32	0074090752	Circuit breaker	1		

【Testing Date】

Cooling Rate



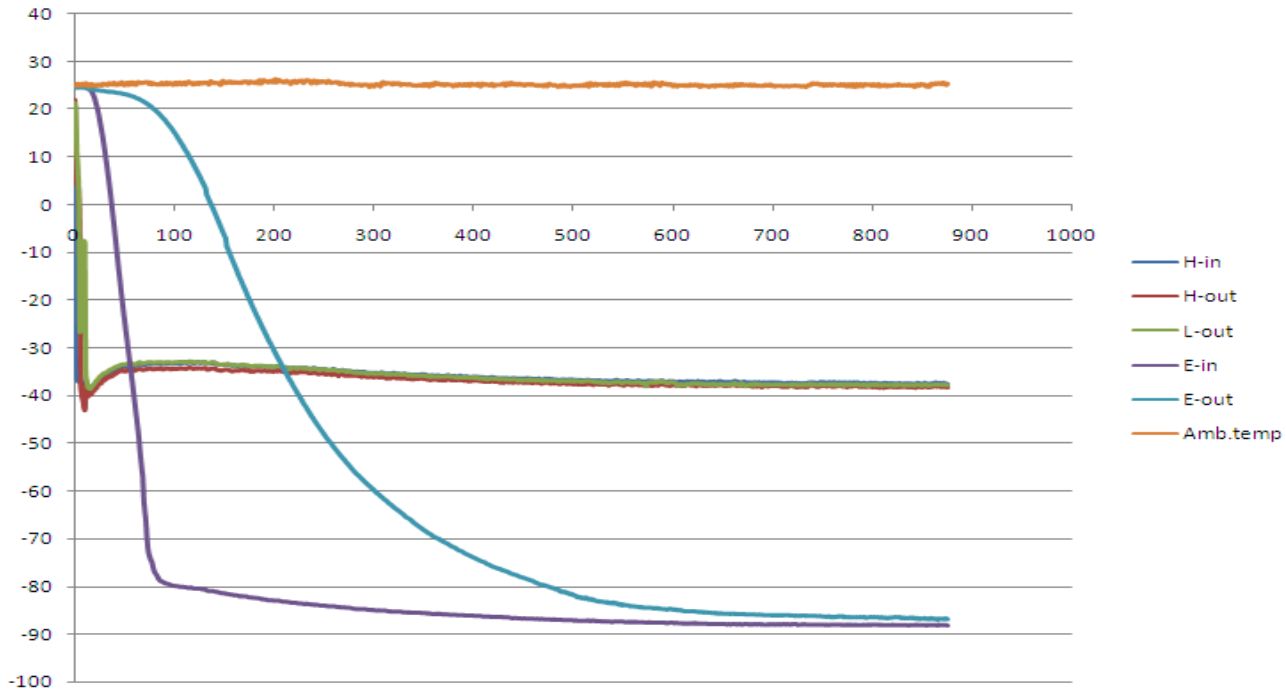
Ambient temp

The third floor center temperature

Cooling Rate

SN	Model	Power supply	Ambient temp	Cooling time(from ambient temp to -80℃)min
1	DW-86L288	220-240V/50Hz	25℃±3	≤360
2	DW-86L388	220-240V/50Hz		≤420
3	DW-86L486	220-240V/50Hz 208-230V /60Hz 115V60Hz		≤420
4	DW-86L628	220-240V/50Hz 208-230V /60Hz 115V60Hz		≤450
5	DW-86L728	220-240V/50Hz 208-230V /60Hz		≤480
6	DW-86L828	220-240V/50Hz 208-230V /60Hz		≤500
7	DW-86L338	220-240V/50Hz 208-230V /60Hz		≤360
8	DW-86L388A	220-240V/50Hz		≤360
9	DW-86W100	220-240V/50Hz 115V60Hz		≤300
10	DW-86W420	220-240V/50Hz		≤360
11	DW-86W490	220-240V/50Hz 208-230V /60Hz		≤420

Temperature of the cooling system parts



Temperature of the parts

sn	model	Power supply	Ambient temp	Cooling system temperature				
				H-IN	H-OUT	L-IN	E-IN	E-OUT
1	DW-86L288	220-240V/50Hz	25℃±3	≤-32℃	≤ -32℃	≤ -32℃	≤ -86℃	≤ -85℃
2	DW-86L388	220-240V/50Hz						
3	DW-86L486	220-240V/50Hz 208-230V /60Hz 115V60Hz						
4	DW-86L628	220-240V/50Hz 208-230V /60Hz 115V60Hz						
5	DW-86L728	220-240V/50Hz 208-230V /60Hz						
6	DW-86L828	220-240V/50Hz 208-230V /60Hz						
7	DW-86L338	220-240V/50Hz 208-230V /60Hz						
8	DW-86L388A	220-240V/50Hz						
9	DW-86W100	220-240V/50Hz 115V60Hz						
10	DW-86W420	220-240V/50Hz						
11	DW-86W490	220-240V/50Hz 208-230V /60Hz						

Inspired living

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